The Ontario Task Force on Employment and New Technology




# Employment and New Technology in the Government Services Industry

An Appendix to the Final Report

86-03662/

# ONTARIO TASK FORCE ON EMPLOYMENT AND NEW TECHNOLOGY

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# APPENDIX 15

# EMPLOYMENT AND NEW TECHNOLOGY

# IN THE GOVERNMENT SERVICES INDUSTRY

This Appendix contains a report prepared for the Ontario Task Force on Employment and New Technology. The topic was approved in advance by the Task Force. At the conclusion of the study, the Task Force had the opportunity to review the report, but its release does not necessarily imply endorsement of the results by the Task Force or its individual members.

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## FOREWORD

The Ontario Task Force on Employment and New Technology, a joint labour-management group, was established in May, 1984, "to consider and report on the manpower and employment implications of new technologies as the same may be introduced and applied in Ontario during the next decade and the extent and nature thereof."

To inform its discussions, the Task Force established a research agenda designed to gather information on employment and technological change from a wide variety of sources. The research agenda contained projects which gathered information of a historical nature, and projects with a future orientation which were designed to gather information describing likely occupational and employment implications associated with technological change in the 1985-1995 period.

The Appendices to the Final Report of the Ontario Task Force on Employment and New Technology contain reports of these research projects. A complete list of these Appendices may be found at the end of this document.

Among the Appendices are reports of a series of studies to assess the extent and nature of the employment implications of new technology in selected industries in Ontario. Appendix 3 describes the process by which the industries were selected, and contains the studies' terms of reference which called for particular attention to selected new technologies and occupational groups. Appendices 4-18 contain reports of these industry studies, which were conducted by Currie, Coopers & Lybrand, management consultants.

This particular appendix contains a report of the study on the Government Services Industry.

Dr. Richard L. E. Brown, P.Eng.
Research Director

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Special thanks are due to all industry experts and survey respondents who provided information for this study.

# EMPLOYMENT AND NEW TECHNOLOGY IN THE GOVERNMENT SERVICES INDUSTRY

A Report Prepared by Currie, Coopers & Lybrand
for the Consideration of the Ontario Task Force
on Employment and New Technology

July 1985

Submitted By: Maureen Farrow
Victor Rocine
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& Lybrand
Management
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# EMPLOYMENT AND NEW TECHNOLOGY IN THE GOVERNMENT SERVICES INDUSTRY

## PART I - INTRODUCTION AND METHODOLOGY

### 1.0 INTRODUCTION

This report is one of a series of industry reports which summarize the findings of a major research project[1] undertaken for the Ontario Task Force on Employment and New Technology. Each report includes a historical analysis and an outlook to 1995 for the industry, and a review of the anticipated impacts of new technology on employment.

### 1.1 Structure of This Report

This report presents the study findings for Ontario's Government Services Industry which includes:

| Industry | Standard Industrial Classification[2] |
|---|---|
| - Federal Administration | SIC 909 |
| - Provincial Administration | SIC 931 |
| - Local Administration | SIC 951 |

Federal Administration is described in Section I, followed by Provincial Administration in Section II, and finally, Local Administration in Section III.

- Part I (Chapter 1.0) is the Introduction which includes a description of the approach and methodology.

[1] Manpower and Employment Implications of New Technologies in Selected Service Industries in Ontario to 1995. The terms of reference of this assignment can be found in Appendix 3 to the Task Force's final report.

[2] 1970, Standard Industrial Classification (SIC), Statistics Canada.

- Part II (Chapter 2) includes a Historical Analysis for the industry from 1971 to 1984, which provides background and a perspective on the industry's historical development.

  Part III (Chapters 3.0 to 7.0) discusses the results of the survey of departments in the Government Services Industry and incorporates the interview findings with industry experts. These chapters cover:

  - a review of recent and anticipated technology adoptions,

  - the outlook for the industry to 1995, including expected output and employment levels,

  - effects on employment of new technology such as anticipated occupational shifts and changes in required skills,

  - a review of the labour relations environment as it relates to new technology, and

  - observations on planning efforts for technological change in the industry.

- Part IV of the report includes various appendices that support the text of individual chapters.

## 1.2 Study Approach

The study approach selected incorporates the following research techniques:

- analysis of published statistics and reports on the industry, augmented by the working knowledge of industry specialists within Currie, Coopers & Lybrand,
- in-depth interviews with management and labour experts in the industry, conducted at various stages in the project, using structured interview guides, and
- an industry survey of the three levels of government.

The reasons for the choice of these techniques are explained below.

### 1.2.1 Historical Analysis

The purpose of the historical analysis was to provide an informed perspective on the industry from which to view future trends. The historical analysis covers: the economic environment, competitive factors, output and employment patterns, productivity, technology adoption and the industrial relations environment. In order to permit cross industry analysis, consistent indicators and data sources were used.

### 1.2.2 Expert Interviews

At various stages in the project, a series of in-depth interviews were conducted with industry leaders, industry associations and union representatives. These experts

have a broad understanding of the industry in terms of both its historical development and its future outlook. Their input assisted in the preparation of the historical analysis and in the survey design, and facilitated a clearer interpretation of the survey results.

### 1.2.3 Sample Survey of Organizations

The following describes the key features of the survey.

For the survey of federal (SIC 909)[1] and provincial (SIC 931)[2] public administration, government departments were treated as separate organizations and structured by employment size category. Federal government departments with 500 or more employees in Ontario, and provincial ministries with 200 or more employees[3] were included in the sample frame. In both the federal and provincial governments, a few departments which are dominated by occupations not selected for study by the Task Force, were excluded.[4] The departments in the sample frame represent 87 percent of the federal[5] and 80 percent of the provincial public administration employees in Ontario.[5]

---

1. SIC 909 "Other Federal Administration" excludes National Defense - enlisted and civilian personnel (which is SIC 902) and Canada Post (which is SIC 548).

2. SIC 931 excludes hospitals, educational institutions, and Crown Corporations such as Ontario Hydro.

3. Ministry stratification included classified civil servants (full-time, permanent civil servants) only. It excluded Crown employees, casual, contract and seasonal employment.

4. A few departments, dominated by occupations not selected for investigation by the Task Force, were excluded from consideration in the survey.

5. In the Federal Government, the following Departments were excluded from consideration: Justice, Royal Canadian Mounted Police and Correctional Services. In the Provincial Government, the following Ministries were excluded from consideration: Attorney General, Solicitor General and Correctional Services.

For the survey of municipal governments (SIC 951), the sample frame included all Ontario municipal corporations with 500 or more employees.[1] These larger local governments include 78 percent of the municipal employees in Ontario.[1]

Government Services Industry - Sample Frame

| | SIC 909 Federal | SIC 931 Provincial | SIC 951 Local |
|---|---|---|---|
| Small | n.a. | n.a. | n.a. |
| Medium | 7 (500-999) | 6 (200-999) | 18 (500-999) |
| Large (1,000+) | 15 | 13* | 21 |
| | 22 | 19 | 39 |

n.a. Not applicable.

* Includes Workers' Compensation Board.

A representative, random sample of organizations, stratified by employment size categories (see Appendix A), was chosen from the sample frame. The senior executive officer of each organization was identified and a structured questionnaire was sent to this individual.

---

1. Includes upper tier (i.e., counties, regional and metropolitan municipalities) and lower tier governments (i.e., cities, boroughs, towns, villages). Source: Ontario Ministry of Municipal Affairs and Housing, Municipal Analysis and Retrieval System.

A search was carried out of the Ontario Ministry of Labour Collective Agreements Library to identify unions in the sample organizations. Union head offices were contacted to identify the appropriate union leader in each of the unionized organizations in the sample. The same questionnaire was sent to union representatives. A copy of the survey questionnaire is attached as Appendix B, together with outlines of the number of responses by question.

Consultants provided ongoing assistance to respondents, both on the telephone and in person, to complete the questionnaires. The questionnaire survey process generally ended with a personal interview. The number of organizations and unions who participated in the sample survey by employment size and level of government are shown in Table 1, below.

TABLE 1

GOVERNMENT SERVICES INDUSTRY - SIC 909, 931, 951
NUMBER OF ORGANIZATIONS AND UNIONS RESPONDING BY ORGANIZATION EMPLOYMENT SIZE

| Organizations by Employment Size | SIC 909 Federal | | SIC 931 Provincial | | SIC 951 Local | |
|---|---|---|---|---|---|---|
| | Departments | Unions | Ministries | Unions | Municipalities | Unions |
| Medium (500-999) | 1 | 0 | 1* | 0 | 3 | 3 |
| Large (1,000+) | 7 | 2 | 7 | 0 | 7 | 4 |
| Total | 8 | 2 | 8 | 0 | 10 | 7 |

* 200-999 employees for Provincial Administration (SIC 931)

In most cases, several participants in each organization contributed to the completion of a questionnaire. In the Government Services Industry survey, an average of 3.3 participants contributed to an organization questionnaire and 1.2 participants to a union questionnaire. The organizations' principal participants had an average of 9 years' experience with their employers and 19 years in the sector. The unions' principal participants had an average of 11 years' experience both with their employers and in the sector.

TABLE 2

GOVERNMENT SERVICES SECTOR - SIC 909, 931, 951
AVERAGE NUMBER OF PARTICIPANTS PER QUESTIONNAIRE AND EXPERIENCE OF PARTICIPANTS

| | | Departments, Ministries or Municipalities | | | Unions | | |
|---|---|---|---|---|---|---|---|
| SIC | Sector | Average Number of Participants Per Questionnaire | Average Years in Organization | Average Years in Sector | Average Number of Participants Per Questionnaire | Average Years in Organization | Average Years in Sector |
| 909 | Federal | 3.6 | 5.7 | 18.0 | 1.0 | 7.0 | n.a. |
| 931 | Provincial | 3.4 | 10.2 | 15.8 | n.a. | n.a. | n.a. |
| 951 | Local | 2.8 | 11.1 | 22.1 | 1.4 | 15.4 | 16.0 |

n.a. - not applicable or no answer.

The sample survey results have been weighted up to the number of organizations in the sample frame. That is, tne survey results reported herein refer to the weighted survey results and are, therefore, representative of Federal Government departments in Ontario with 500 or more employees, Ontario Provincial Ministries with 200 or more employees, and Ontario municipalities with 500 or more employees. Reliability of the sample and the degree of error are as follows (see Appendix C for an explanation of the sample reliability calculation method).

| SIC | Sector | Estimate of Statistical Reliability | Estimate of Degree of Error |
|---|---|---|---|
| | | Percent | Percent |
| 909 | Federal | 90 | +/- 11 |
| 931 | Provincial | 90 | +/- 11 |
| 951 | Local | 90 | +/- 13 |

Readers should be cautioned about the nature and reliability of the sample survey results. The questionnaire included a set of questions asking respondents about the future (i.e., five and ten years ahead) from a particular point in time. The results are, therefore, a representative sample of views about, and expectations for, the future and should not be viewed as what will necessarily take place. The survey provides a useful perspective from which to better understand how the industry perceives the future of new technology adoption and its anticipated impacts on employment.

Subsequent parts of the report discuss, for each of the three levels of government in the Government Services Industry, the historical analysis and review the results of the sample survey and expert consultation which discuss the anticipated trends for the period 1985 to 1995.

# SECTION I - FEDERAL ADMINISTRATION

## PART II - HISTORICAL TRENDS 1971-1984

This part of the report (Chapters 2.0 to 7.0) presents the historical analysis (1971-1984) for Federal Public Administration, SIC 909, in Ontario and the results of the sample survey and expert interviews conducted on expected trends in employment and new technology and related issues.

### 2.0 INTRODUCTION

This section of the report provides a brief historical analysis of federal administration in Ontario for the periods 1971-1981 and 1982 to 1984, including:

- market environment,
- aggregate output,
- competitive position,
- capital investment, and
- employment.

The data used for the analysis is taken from officially published sources which are documented on each respective table. It is augmented by the working knowledge of the experts within Currie, Coopers & Lybrand and from the expert consultations which have been conducted.

### 2.1 The Structure of the Organization

The Federal Government is the senior level of government in Canada. It exercises powers laid down in the British North America Act as well as residual powers that have evolved during

the country's history. In the fiscal year 1983-84, the federal government spent a total of $98.4 billion (on a national accounts basis).[1]

For the purpose of this report we will make use of the Provincial Economic Accounts for 1982 which show Federal Government activities by province. In 1982, the Federal Government excluding national defence and the post office spent $24.3 billion in Ontario and employed 79,369 people. The federal representation in Ontario is enhanced by the fact that the capital is located in Ottawa and thus a great proportion of the central functions of the government are performed from that base. In addition, the Federal Government operates regional offices in major centres, such as Toronto. In 1983, 41 percent of federal employees were located in Ontario.

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1. The Federal Government's financial position is presented in two forms the public accounts system and the national accounts system. The public accounts system provides considerable detail on activities by function, but the totals for revenue and expenditure are understated because some revenues and expenditures are netted out in off-budget accounts. Because of these problems, we prefer to use the national accounts basis for any measures of the overall size of the Federal Government. Public accounts data are used only to show the composition of spending or revenue.

The Federal Government is the largest and the most rapidly growing of the three levels of government in Ontario. Table D.1 (see Appendix D) shows that federal expenditure accounted for 17.7 percent of gross provincial product (GPP) in 1982, up from 11.7 percent in 1971. Provincial expenditure accounted for 10.4 percent of GPP in 1982 and local government accounted for 8.1 percent.

The major expenditures of the Federal Government (shown in Table D.2) include social affairs - mainly direct social payments to individuals, interest on the public debt, economic development, defence and transfers to other levels of government. During the period from 1976 to 1982, federal outlays nearly doubled from $40.4 billion to $79.8 billion. The only type of expenditure to show a significant increase in the share of total spending was interest on the public debt which rose from 11.7 percent of the total in 1976-77 to 21.3 percent of the total in 1982-83.

Defence spending (shown here in order to illustrate the total expenditure system) also showed an increase in share from 8.4 to 8.8 percent. However, the share of the biggest category of spending, social affairs, dropped from 46.1 percent to 40.1 percent.

The Federal Government also has a pronounced effect on the allocation of resources in the economy through special concessions in the tax system, known as tax expenditures. Special tabulations presented in 1979 showed that federal tax expenditures amounted to many billions of dollars.[1] However, the method of estimation is not yet generally accepted and no regular updates of the figures are available. Accordingly, tax expenditures will not be discussed in this report.

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1. No precise totals are calculated because the expenditures are not cumulative. Department of Finance, Government of Canada Tax Expenditure Account, December, 1979.

## 2.2 The Market Environment

The Federal Government's activities have grown rapidly over the past decade from 18.5 percent of gross national product in 1970-71 to 25.3 percent in 1983-84. The main reasons for the increase have been:

- Enrichment of key social programs such as unemployment insurance, family allowances and assistance for the aged. These programs were revised in the early 1970's when the government was running a small surplus on a national accounts basis.

- Deterioration in the country's economic performance which led to much higher unemployment and greater claims against social programs.

- Greater activism on the part of the government in trying to support economic activity. The Federal Government has become heavily involved in the energy sector, for example, and is devoting greater resources to subsidies to business.

- Higher levels of transfers to the provinces as a result of commitments for shared cost programs (mainly for health and education) and for equalization of the revenue base of the ten provinces. These transfers are made on the basis of complex formulas negotiated by the two levels of government. The formulas will be renegotiated by 1987.

- Higher interest charges on the public debt. The net debt outstanding has grown from $19 billion in March 1971 to $156 billion in March 1984. At the same time, interest rates have increased dramatically (not only in Canada, but world-wide). For example, a one percentage point increase in the average interest rate paid on the federal debt adds $1.56 billion to debt charges in one year.

Governments do not operate in a commercial market environment. They are part of, and subject to, a political process. Political leaders are elected to serve citizens and their decisions while in office will reflect a combination of forces including:

- Their desire to please the electorate and be reelected.
- Their personal ideological and policy preferences.
- The policy preferences of their key advisors and political supporters.

The checks and balances in the system are intended to ensure that money is spent in compliance with the relevant legislation, but no specific limits exist on the amount of spending. The Federal and Provincial Governments have considerable power to raise taxes and to borrow money. The Federal Government also has considerable influence over the supply of credit and the level of interest rates, so that it can, for short periods at least, create a favourable environment for the sale of government bonds. Because of this power to tax and to print money, lenders tend to view federal bonds as being sovereign debt and therefore subject to less risk than that of junior governments or private sector borrowers. This means that the Federal Government does not face either a market or a legislative constraint on the amount it can borrow.

The lack of an obvious constraint on borrowing has become a major political issue in Canada in recent years because of the rapid build-up of federal debt outstanding. In the past year or two, key measures of federal indebtedness have begun to create concern in the financial markets. The ratio of interest on the public debt to total federal revenues has increased from a low of 9.9 percent in 1974 to 25.4 percent in 1982 and 24.8 percent in 1983 (see Table D.3). In addition, the ratio of net federal debt outstanding to gross national product has increased from a low of 16.6 percent in fiscal 1974-75 to 34.7 percent in 1982-83. This

ratio is projected to rise very quickly through the 1980's and to reach 63.2 percent by 1990-91.[1]

Both these measures of indebtedness have led policy analysts and financial experts to call for drastic measures to reduce the federal deficit through some combination of tax increases and expenditure cuts.

Citizen reaction to the federal fiscal position is more ambiguous. Many Canadians are concerned that tax burdens are already too high and they would react negatively to major tax increases. Many also argue that government is inefficient or providing inadequate service, but they are not in a position to offer much concrete advice on where changes should be made. Most Canadians also wish to hold on to the programs that generate direct benefits to them, and are defensive about maintaining the universality of federal social programs.

In short, there is no real political constituency for reductions in expenditure and there is a strong negative reaction to tax increases. Meanwhile, the deficit has reached a size (about $30 billion) where it takes a substantial restructuring of programs to create a reduction of any significance.

In the federal election campaign of 1984, the Progressive Conservative Party did not seek a mandate to cut the deficit, but their first statement on economic policy on November 8, 1984, indicates that deficit reduction may be the main theme of their administration which runs until 1988. However, they must now build a constituency for program changes. Indeed, the pressure from financial markets is now so strong that deficit reduction would have to be a high priority no matter which party was in office.

1. A New Direction for Canada, An Agenda for Economic Renewal, November 1984.

In summary, there are now strongly conflicting pressures on the Federal Government with respect to the trend in expenditures. The financial environment is negative (see Table D.4), in the sense that revenue growth, receptiveness to tax increases and the level of indebtedness have all become less favourable to increasing expenditure. At the same time, however, the economic environment is one that creates strong pressure to raise expenditure in the form of economic support for business and measures to alleviate unemployment. In addition, there are unavoidable contractual obligations to make transfers to the provinces and to service the public debt. These obligations turn out to be more expensive than originally envisaged because of the weak state of some provincial economies and the unexpectedly large increases in debt outstanding.

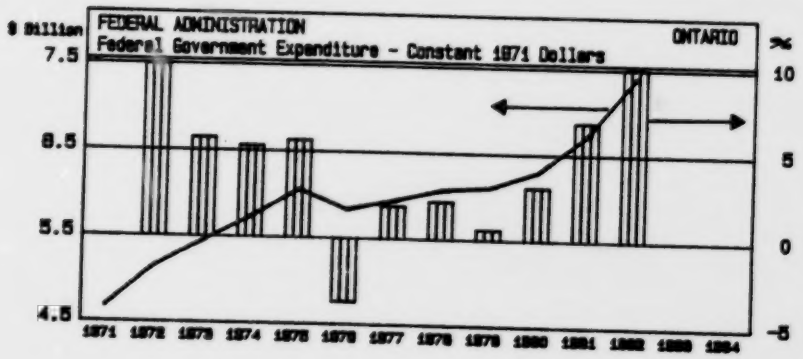
The bottom line in this situation will be substantial pressure on the Federal Government to undertake cost-saving or efficiency measures.

## 2.3 Industry Trends

Tables D.5 to D.8 present key sectoral indicators for the years 1971 to 1984.

### 2.3.1 Aggregate Output

EXHIBIT 1



The only measure of federal output in Ontario is the data on expenditures provided by Statistics Canada in the Provincial Economic Accounts. Federal expenditure in Ontario in current dollars increased from $4.7 billion in 1971 to $19.8 billion in 1981, an average annual rate of increase of 15.5 percent. In 1982, spending increased by 22.4 percent to $24.3 billion. The rate of growth was strongest in 1974, 1975, 1981 and 1982. These were all years of weak economic growth, suggesting that the level of federal spending in Ontario is strongly influenced by the automatic stabilizer programs such as unemployment insurance.

Federal expenditure in Ontario in constant dollar terms increased from $4.7 billion in 1971 to $6.7 billion in 1981, an average gain of 3.7 percent per year. Spending then increased by 10.0 percent to reach $7.4 billion in 1982.

### 2.3.2 Competitive Position

The deflator used to estimate constant dollar expenditure in the government sector is constructed on the basis of changes in employment over time. Statisticians assume that productivity in the government sector is constant, so any increase in nominal values that is not accounted for by a rise in employment is assumed to be caused by a rise in prices. As a result, we are not able to evaluate productivity trends or the competitive position of government.

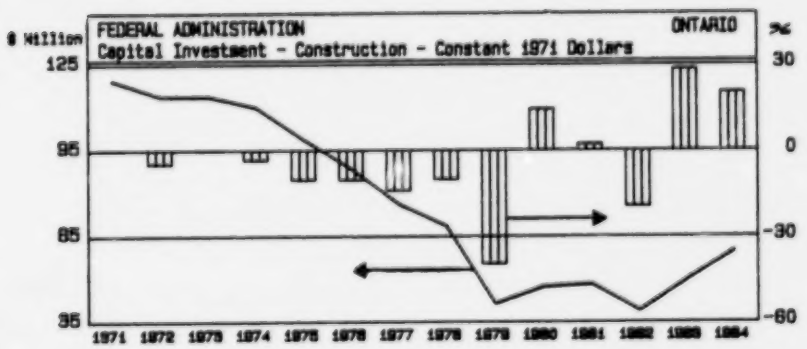
### 2.3.3 Capital Investment

Total investment by the Federal Government in Ontario rose from $190 million in current dollars in 1971 to $428

million in 1981, an average annual rate of change of 8.5 percent. Investment then increased to an expected $632 million in 1984, an average annual increase of 13.9 percent over 1981.

Construction expenditures increased slowly over the 1981 to 1984 period, but machinery and equipment expenditures soared from $70 million in 1971 to $300 million in 1981 - an annual gain of 15.6 percent. Outlays on machinery and equipment dropped in 1982, but then rose very rapidly to $456 million in 1984, an average gain of 14.9 percent per year over 1981. As a result, machinery and equipment spending amounted to 37 percent of total investment in Ontario in 1971, and 72 percent in 1984.

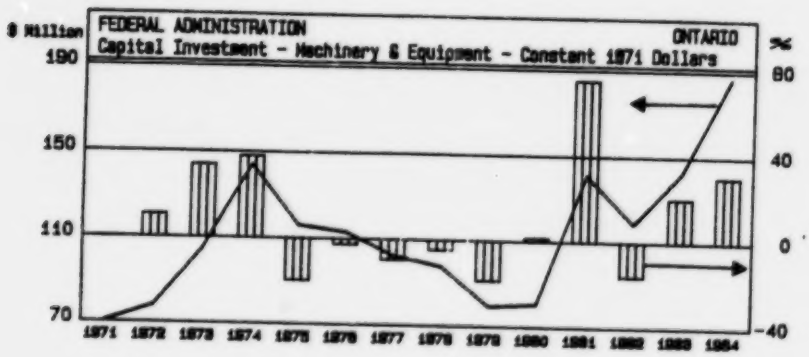
EXHIBIT 2




In constant dollar terms, total federal investment in Ontario dropped from $190 million in 1971 to $189 million in 1981. Investment declined further to $157 million in

1982, but then rose sharply for the next two years to reach $246 million in 1984. Constant dollar construction outlays dropped from $119 million in 1971 to $48 million in 1981 and then rose slightly to $60 million by 1984.

EXHIBIT 3



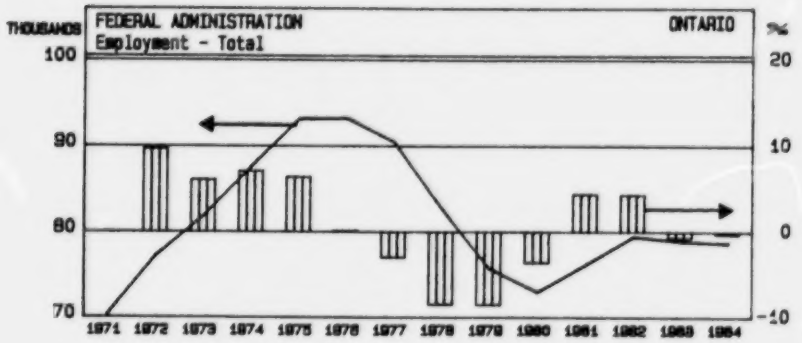

Constant dollar expenditure on machinery and equipment rose from $70 million in 1971 to $141 million in 1981, but the period was marked by two distinct cycles, with strong gains from 1971 to 1974, followed by a long downswing from 1975 to 1979 and a sudden upswing in 1981. The average annual rate of increase from 1971 to 1981 was 7.2 percent. Constant dollar outlays of machinery dropped 16.1 percent in 1982, but increased dramatically in 1983 and 1984. The average annual rate of increase from 1981 to 1984 was 9.7 percent.

### 2.3.4 Employment

The discussion of employment includes an analysis of aggregate trends and occupational changes.

- Aggregate Trends

EXHIBIT 4




Total employment of the Federal Government in Ontario rose from 70,256 in 1971, to 76,089 in 1981, an average annual increase of 0.8 percent (Tables D.5 and D.6). Employment increased rapidly from 1971 to 1976, when it peaked at 93,167. It then declined until 1980, then rose in 1981 and 1982, reaching a new peak of 79,369 in 1982. Employment declined at an average annual rate of 0.5 percent from 1982 to 1984. The decreases in the late 1970's coincided with three forces affecting federal employment in Ontario:

- The construction of major federal office blocks in Hull, across the river from Ottawa.

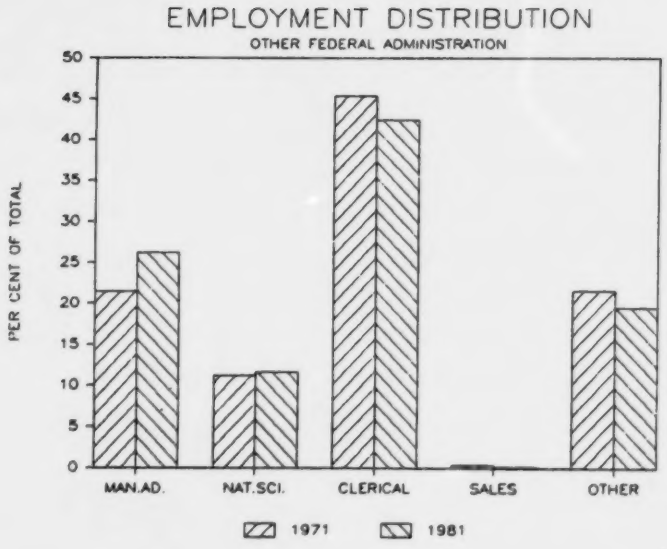
- The effort to decentralize federal agencies to other regions of the country. Veterans Affairs personnel were moved to Prince Edward Island, for example, and taxation data centres were established in various cities across the country.

- The Federal Government program "Attack on Inflation" announced in late 1975 made an attempt to reduce total staff as a means of reducing expenditures.

As a result, Ontario's share of total employment dropped from 46 percent for the years 1971 through 1976 to 41 percent for the years 1980 through 1983.

- Occupational Changes

EXHIBIT 5




The census data on occupations in Other Federal Administration presented in Table D.9 shows total employment in 1981 of 105,415. Employment increased at an average annual rate of 2.4 percent per year from 1971. This appears to cover about 63 percent of the employees included in the Statistics Canada data reported earlier. (The Public Service Commission data shows total employment of 88,469 in 1981).

At the broad occupational level of classification, employment grew more quickly than the total for this sector in Managerial and Administrative positions (4.4 percent) and in Natural Sciences, Engineering and Mathematics occupations (2.8 percent). Clerical occupations increased by only 1.7 percent. The Other occupations category (see Exhibit 5) was represented mainly by service employment such as police officers, guards and janitors, together with persons employed in social science occupations such as economists.

At the more detailed occupational level, the following trends were apparent:

- In Managerial and Administrative positions, above average growth was recorded for accountants, auditors and other financial officers, perhaps because of a conscious effort to upgrade financial planning across the government. Also above average growth occurred in two other general categories, other managers and administrators and officials and administrators unique to government. This data is difficult to interpret, since there are other "general" titles with a larger number of employees, such as occupations related to management and administration, not elsewhere classified, which increased at a very slow rate.

- In Natural Science and Engineering occupations, above average growth occurred for industrial engineers (10.2 percent) and systems analysts and computer related occupations (6.4 percent).

- In the Clerical group, declines were reported for clerks, typists and clerk typists, and for supervisors of clerical workers. Above average growth was reported for receptionists and information officers, statistical clerks, electronic data processing operators, and bookkeepers and accounting clerks.

Female representation in federal administration increased from 40.6 percent in 1971 to 47.8 percent in 1981 (see Table D.10). Half of the new jobs for women came in their areas of traditional employment - clerical and related occupations. But a substantial increase in female representation occurred in Managerial and Administrative jobs - up from 13.7 percent in 1971 to 27.8 percent in 1981. The gains were most noticeable in occupations such as inspectors and regulatory officers, government administrators and accountants, auditors and other financial officers.

Female representation in Natural Sciences and Engineering occupations increased from 10.5 percent in 1971 to 17.2 percent in 1981, with the gains being concentrated in the two areas of rapid job growth mentioned earlier - industrial engineers and systems analysts.

## PART III - FUTURE TRENDS: THE SURVEY RESULTS

Part III of this study presents the survey results which discuss organizations' surveyed opinions as to future trends in technology adoption and employment impacts.

### 3.0 ADOPTION OF NEW TECHNOLOGY

This chapter reviews the expected trends in the adoption of new technologies in Federal Public Administration and the factors driving the need and affecting the rate of technology adoption. The discussion is based on the survey results and the expert consultation process.

### 3.1 New Technologies and Rates of Adoption

Government Administration is a sector where the adoption of new technologies is uneven. Some offices and departments are very advanced in their use of computer technologies, while others lag far behind. While it is difficult to generalize about the Federal Government as a whole, one possible rule of thumb is that the departments and agencies with a hard service to deliver to the public (such as Unemployment Insurance or Statistics Canada) have made earlier and better use of computer technologies than those with softer services such as policy formation or more general administrative functions where it is more difficult to document the cost benefit of computer or office automation installations.

The Federal Government has some of the largest computer installations in Canada, for example, in the Department of Supply and Services (DSS), Revenue Canada and Health and Welfare. These early installations were set up to handle large scale accounting systems in the 1960's. The general approach to computerization was to choose between the DSS service bureau, internal general purpose installations and special purpose computers dedicated to a single application (such as the Unemployment Insurance Commission or the RCMP). In addition, most departments

contracted out work to external service bureaus on the basis of the government's make or buy regulations.

During the 1970's, there was a gradual shift from DSS and departmental service bureaus to the use of minicomputers for special purposes. Since the beginning of the 1980's, microcomputers have also increased in use. They have proliferated in some departments where there has been a laissez-faire approach; that is, users have been encouraged to buy what they wanted. However, this had led to highly fragmented use of both micros and software. As a result, most departments are now shifting to a modified laissez-faire approach where users are encouraged to state their needs. Then the departmental Information Centre makes the purchase for the user in order to take advantage of price discounts and also to maintain better control of both hardware and software. This creates some scope for uniformity in application, enables the user to plug into a common data bank and to make use of software or augmented software already available in the department.

In contrast to the laissez-faire approach, the Department of Communications has taken a very structured approach to office automation, providing seed money to outside suppliers like Systems House and Bell Northern Research to undertake pilot projects in selected areas of federal administration. These projects are now being evaluated. In addition, the Treasury Board created a Task Force on Informatics to address growing concerns related to the management of informatics resources (approximately $1 billion annually) within the Federal Public Service. The term "informatics" includes electronic data processing and office systems and telecommunications and their convergence and interconnection.

The Task Force's responsibilities include such areas as policy development, strategic and human resource planning including training, procurement, implementation and specifically acting as a catalyst and resource to assist managers in the Federal Government with the acquisition, implementation and exploitation of the new technology.

In general, computers are now widely used at the operating level, most often by technically trained and younger officers who are eager to replace calculators and manual work sheets. However, there are relatively few successful applications of computers or office automation systems intended to support executive decision making. These installations and the corresponding realignment of staff still lie in the future.

The employment effects of the new technologies are diverse. The most obvious problem that arises is that of reorganizing work in a system that is highly structured, where wage levels and job classifications must be applied across dozens of departments and agencies. The introduction of word processing equipment, for example, has led to a shift in needs from secretarial and clerical positions to OCE's (office composing equipment operators). Because OCE's are paid less than clerks, there is a constant shortage of qualified people. These shortages are filled by using temporary staff.

The rate of adoption of new technologies in the Federal Government is often retarded by the decision making processes. Departmental managers are anxious to ensure that equipment installed will be compatible across the department and with associated agencies. This leads to extended periods of pre-feasibility and feasibility studies that cause frustrating delays for those who want the new equipment. In some cases too, senior management that is uncomfortable with the new technologies can hold up the implementation process. This helps to explain why some departments have been so slow to install new computer and communication systems.

Decisions to adopt new technologies can be categorized in three ways, according to one expert interviewed. The technology is purchased on the basis of:

- A documented plan to improve efficiency.

- A political decision to promote the use of a specific technology. An example would be Telidon.

- Responses to a vigorous marketing effort. Two examples would be the new Rohm telephone system and the decision to experiment with direct funds transfer.

The speed of adoption also depends on the spending authority provided by Cabinet for purchase of new equipment.

The Federal Government is a strong candidate for new technology adoption for a variety of reasons:

- It is information intensive.

- It is highly centralized in its control.

- There is a high degree of repetitiveness in the nature of services delivered and standardization in information requirements.

- The Federal Government is a potential leader in supporting the economic development of Canadian suppliers of the new technologies.

Table 3 (see page 28) summarizes the survey results of Federal departments in Ontario in terms of the percentage of departments who have adopted representative new technologies before 1985 and their plans for using these technologies in the next five years and after 1990.

In general, larger departments (i.e., those with 1,000 or more employees in Ontario) have been more aggressive than smaller departments (i.e., those with 500 to 999 employees in Ontario) in implementing new technologies to date and are more advanced in their plans for new technology adoption in the future. However, the sample size, which includes seven larger departments and only

one medium sized department, limits the conclusions which can be drawn about variations in departments by employment size.

### 3.1.1 Service Delivery Technologies

- Of the large departments, a high percentage report already having some form of

  - on-line client data bases (86%),
  - direct data entry from the field (86%),
  - electronic processing of service requests (54%), and
  - computerized inventory control (71%).

  The remaining large departments and medium sized departments have plans to adopt these technologies in the next five years.

### 3.1.2 Design Technologies

Design technologies include: computer-aided design (CAD), engineering (CAE), mapping and project management and 4th generation computer languages. The survey findings suggest that:

- Many departments which can make use of CAD, CAE, and computer aided mapping and project management already are using these technologies and all departments that can make use of these technologies will before 1990.

- Approximately 60 percent of the departments are already using 4th generation computer languages and virtually all departments will be by 1995.

Results of Question 3

## TABLE 3: FEDERAL ADMINISTRATION

SIC 909

Percent of Organizations Planning to Adopt New Technologies by Employment Size (1)

| Technologies | Before 1985 | | | 1985-1990 | | | 1990-1995 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Medium | Large | Total | Medium | Large | Total | Medium | Large | Total |
| **SERVICE DELIVERY TECHNOLOGIES** | | | | | | | | | |
| On-Line Client Data Bases | 0 | 86 | 80 | 100 | 14 | 20 | - | - | - |
| Direct Data Entry from Field | 0 | 86 | 80 | 100 | 14 | 20 | - | - | - |
| Electronic Processing of Service Requests (e.g. test claim validity) | 0 | 57 | 54 | 100 | - | 6 | - | - | - |
| Electronic Service Delivery | 0 | 29 | 27 | 100 | 14 | 20 | - | - | - |
| Computerized Inventory Control | 0 | 71 | 67 | 100 | 42 | 46 | - | 14 | 13 |
| **DESIGN TECHNOLOGIES** | | | | | | | | | |
| Computer-Aided Design (CAD) | 0 | 29 | 27 | 100 | 43 | 46 | - | - | - |
| Computer-Aided Engineering (CAE) | 0 | 14 | 13 | 100 | 14 | 20 | - | - | - |
| Computer-Aided Mapping | 0 | 43 | 40 | 100 | - | 6 | - | - | - |
| Computer-Aided Project Management | 0 | 86 | 80 | 100 | 29 | 33 | - | - | - |
| 4th Generation Computer Languages | 100 | 57 | 60 | - | 43 | 40 | - | 14 | 13 |
| Other | 0 | 14 | 13 | - | - | - | - | - | - |
| **OFFICE AUTOMATION TECHNOLOGIES** | | | | | | | | | |
| Mainframe/Minicomputers | 100 | 100 | 100 | - | - | - | - | - | - |
| Word Processing | 100 | 100 | 100 | - | - | - | - | - | - |
| Electronic Filing | 0 | 43 | 40 | 100 | 43 | 46 | - | 14 | 13 |
| Microcomputers/Personal Computers | 100 | 100 | 100 | - | - | - | - | - | - |
| Internal Data Base Management Systems | 100 | 86 | 87 | - | 14 | 13 | - | - | - |
| Local Area Networks (LANs) | 0 | 29 | 27 | 100 | 86 | 87 | - | 14 | 13 |
| Computerized Decision Support Systems | 100 | 14 | 20 | - | 86 | 80 | - | 14 | 13 |
| Voice Activated Computers | 0 | 0 | 0 | - | 14 | 13 | - | 43 | 40 |
| Artificial Intelligence/Expert Systems | 0 | 0 | 0 | 100 | 43 | 46 | - | 29 | 27 |
| Fully Integrated Work Stations | 0 | 14 | 13 | 100 | 86 | 87 | - | 14 | 13 |
| Data Base Services (External) | 100 | 100 | 100 | - | - | - | - | - | - |
| Other | 0 | 0 | 0 | - | 14 | 13 | - | 14 | 13 |
| **TELECOMMUNICATIONS TECHNOLOGIES** | | | | | | | | | |
| Private Automatic Branch Exchange (PABX) | 0 | 71 | 67 | 100 | 14 | 20 | - | - | - |
| Electronic Mail | 0 | 86 | 80 | 100 | 14 | 20 | - | - | - |
| Voice Mail | 0 | 0 | 0 | 100 | 57 | 60 | - | 29 | 27 |
| Facsimile with Built-In Microprocessor (FAX) | 100 | 57 | 60 | - | 29 | 27 | - | 14 | 13 |
| Satellite/Microwave Systems | 0 | 14 | 13 | 100 | 43 | 46 | - | 14 | 13 |
| Videotex | 0 | 43 | 40 | 100 | 29 | 33 | - | 14 | 13 |
| Video Conferencing | 0 | 14 | 13 | 100 | 14 | 20 | - | 43 | 40 |
| Fibre Optics | 0 | 0 | 0 | - | 71 | 67 | - | 29 | 27 |

(1) '0' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey, are not planning to adopt this technology or 'don't know'. Responses are not mutually exclusive.

### 3.1.3 Office Automation Technologies

- All departments report that they already are using computers, word processing and external data base services.

- Internal data base management systems are already being used in 87 percent of the departments with the remaining expecting to before 1990.

- Currently only 27 percent of the departments are using local area networks (LANs) to integrate office systems and electronic machinery but nearly all departments expected to by 1990.

- Similarly, only 20 percent of the departments are using computerized decision support systems however all departments expect to by 1995.

- By 1990, approximately 80 percent of the departments expect to be using electronic filing.

- By 1990, all departments expect to have integrated work stations for some employees.

- Voice activated computers and expert systems are seen as widely adopted in the near-term (1985 to 1990) and mid-term (1990 to 1995), respectively. Their use is seen as largely dependent on commercial availability.

### 3.1.4 Telecommunications Technologies

Due to the national scope of services, the Federal Government is dependent on timely and efficient communications to operate effectively.

- Private automatic branch exchanges (PABXs) and electronic mail are already used by over 65 and 80 percent of the departments respectively. Approximately 60 percent of the departments already use 'smart' (FAX) facsimile machines and 40 percent use videotex.

- By 1990, 60 percent of the departments expect to be using voice mail and satellite/macrowave systems.

- Before 1995, video conferencing and fibre optics are expected to be widely adopted.

Although the survey suggests the rate of adoption of representative technologies in a department it does not suggest the extent of the adoption. That is, how widespread would technologies be in the department in effecting day-to-day activities. In this regard, the expert interviews conducted suggest the following:

- The Service Delivery Technologies cited above will be widely diffused in the Federal Public Service by 1990 and almost universal by 1995.

- By the early 1990's, the Design Technologies will be widely diffused in the Public Service and almost universal by 1995, where such technologies are applicable.

- Microcomputers will be widely diffused by 1990 and, by 1995, electronic filing, electronic mail and fully integrated work stations will be widely utilized in the Public Service, more so than word processing machines are currently. Computerized decision support systems will show similarly wide usage by 1995.

## 3.2 Forces Driving the Need to Adopt New Technology

Departments in the Federal Government were asked, in a series of open-ended questions, to identify the three most important factors driving their need to adopt new technology. Table 4 summarizes the results of the survey. It shows the percentage of departments which named a factor as their most important, second most important and third most important. Table 4 also shows the weighted importance of each factor which is derived by the following formula:

Weighted Importance = (Most Important % x 3) + (Second % x 2) + (Third % x 1)

Thus, the most important factors named were given a weighting of three (3); the second most important factors named were given a weighting of two (2); and the third factors named were weighted by one (1). The weighted responses for a factor were then totalled to calculate the weighted importance.

The departments indicate the following as the critical driving forces.

| | Overall Weighted Importance |
|---|---|
| • Increased productivity | 1.4 |
| • Increase skills of the organization | 1.3 |
| • Lower costs | 1.0 |
| • Increase quality | 0.9 |

The pattern of responses show a strong need to increase the efficiency and effectiveness of Federal Government services. The need to increase organizational capabilities, increase quality to remain current and satisfy increasingly sophisticated client requirements are all factors related to the theme of effectiveness. The need to increase productivity and lower costs are related to efficiency. Somewhat surprisingly, the need for better management information is not seen as a significant driving factor (0.4).

Results of Question 4

## TABLE 4: FEDERAL ADMINISTRATION — SIC 909

Most Important Factors Driving the Need to Adopt New Technologies

| Factor | | Percent of Organizations by Employment Size | | |
|---|---|---|---|---|
| | | Medium (500-999) | Large (1000+) | Total |
| CUSTOMER DEMANDS FOR CHANGES | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 29 | 27 |
| | Weighted Importance (1) | 0.0 | 0.6 | 0.5 |
| INCREASE PRODUCTIVITY | First | 100 | 14 | 20 |
| | Second | 0 | 43 | 40 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 3.0 | 1.3 | 1.4 |
| INCREASE QUALITY | First | 0 | 29 | 27 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 1.0 | 0.9 |
| INCREASE MANAGEMENT INFORMATION | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.4 | 0.4 |
| LOWER COSTS | First | 0 | 14 | 13 |
| | Second | 0 | 29 | 27 |
| | Third | 100 | 0 | 6 |
| | Weighted Importance | 1.0 | 1.0 | 1.0 |
| INCREASE SKILLS/ ORGANIZATIONAL CAPABILITY | First | 0 | 29 | 27 |
| | Second | 100 | 14 | 20 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 2.0 | 1.3 | 1.3 |
| ALL OTHERS | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 29 | 27 |
| | Weighted Importance | 0.0 | 0.3 | 0.3 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

Results of Question 5

## TABLE 5: FEDERAL ADMINISTRATION

SIC 909

Most Important Factors that Could Slow the Rate of New Technology Adoption

| Factor | | Percent of Organizations by Employment Size: Medium (500-999) | Large (1000+) | Total |
|---|---|---|---|---|
| ABILITY TO FINANCE | First | 100 | 43 | 46 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance (1) | 3.0 | 1.7 | 1.8 |
| COST OF NEW TECHNOLOGY | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.6 | 0.5 |
| LACK OF SKILLS AND/OR KNOW-HOW TO IMPLEMENT | First | 0 | 0 | 0 |
| | Second | 0 | 86 | 80 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 1.7 | 1.6 |
| LACK OF NEW TECHNOLOGY STANDARDIZATION | First | 0 | 29 | 27 |
| | Second | 0 | 0 | 0 |
| | Third | 100 | 29 | 33 |
| | Weighted Importance | 1.0 | 1.1 | 1.1 |
| UNWILLINGNESS TO CHANGE | First | 0 | 0 | 0 |
| | Second | 100 | 0 | 6 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 2.0 | 0.1 | 0.3 |
| ALL OTHERS | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.6 | 0.5 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

## 3.3 Factors That Could Slow the Rate of Technology Adoption

Federal departments were also asked to name the three most important factors which could slow the rate of technology adoption. Table 5 summarizes the percentage of departments which identified each factor as first, second or third in importance. Again, the weighted importance of each factor is shown.

Similarly, a limited number of factors were identified which could slow the rate of technology adoption. Overall, for the federal departments surveyed, the critical factors which could slow their rate of technology adoption are:

| | Overall Weighted Importance |
|---|---|
| • Ability to finance | 1.8 |
| • Lack of skills/know-how | 1.6 |
| • Lack of new technology standardization | 1.1 |

Lack of new technology standardization was cited more frequently by Federal Government respondents than in any other industry surveyed. Willingness to change was not perceived by federal managers as a key retarding factor (0.3). Cost of technology (0.5) was a contributing factor but relatively unimportant compared to the top three factors. The lack of training and staff development to ensure employee acceptance was cited as a slowing factor. Union resistance was not mentioned.

## 4.0 INDUSTRY OUTLOOK TO 1995

This chapter describes the views of respondents in the Federal Government on the outlook for federal administration expenditures, investment plans, aggregate employment and changes in occupational structure to 1995, in Ontario.

### 4.1 Output to 1995

Between 1971 and 1981, Federal Administration Expenditures in Ontario increased in constant dollars at an average annual growth rate of 3.7 percent. From 1981 to 1982, they rose by 10.4 percent. These expenditures exclude transfer payments to provincial and local governments plus gross capital formation.

Respondents were asked to estimate future expenditure growth in constant dollars. The results are shown in Table 6. The respondents suggest a 7.5 percent rate from 1982 to 1983, 9.0 percent from 1983 to 1984 and 7.0 percent from 1984 to 1985. This results in a 24 percent increase in real dollars over the three years from 1982 to 1985.

The survey respondents on average indicated a 5.5 percent compound annual growth rate for each of the periods 1985 to 1990 and 1990 to 1995. Given these real growth rates, it would appear that respondents had difficulty discounting for inflation. A comparison of projected growth in expenditures and inflation in the May 1985 budget documents suggests a real growth rate of 1 to 2 percent for the next two fiscal years.

### 4.2 Investment Patterns

Although the questionnaire asked for capital investment in Ontario, the responses were not adequate to report the findings.

Results of Question 1

**TABLE 6: FEDERAL ADMINISTRATION** SIC 909

Federal Government Administration Expenditures in Ontario

Average Annual Compound Rate of Change (in Constant Dollars) (1)

| Organizations by Employment Size | Estimated 1982-1983 | Estimated 1983-1984 | Estimated 1984-1985 | Expected 1985-1990 | Expected 1990-1995 |
|---|---|---|---|---|---|
| Medium (500-999) | n.a. | n.a. | n.a. | n.a. | n.a. |
| Large (1000+) | 7.5 | 9.0 | 7.0 | 5.5 | 5.5 |
| Total | 7.5 | 9.0 | 7.0 | 5.5 | 5.5 |

(1) Rounded to closest 0.5%
n.a. - no answer

The survey results did suggest, however, that approximately 16 percent of total capital investment will be in structures and buildings while the remainder will be allocated to machinery and equipment, and further, that approximately two-thirds of the machinery and equipment expenditures will be related to new technology.

### 4.2.1 Justifying Financial Investment in New Technology

When considering investments in new technology only one of eight respondents indicated the use of a pay-back period and in this case they expected a pay-back within two to three years. Federal departments used other methods for evaluating new technology investments such as:

- qualitative benefits, e.g., service to the public,
- cost/benefit analysis, e.g., increased productivity, and
- need to keep technologically current.

### 4.2.2 Source of New Capital Spending

This question was essentially irrelevant to the federal departments because all funding comes internally from the Federal Government and it is, therefore, impossible to allocate the financing of capital expenditures as being from current revenues or debt financing.

## 4.3 Employment to 1995

This section reviews expected trends in employment patterns and the most important factors affecting aggregate employment.

### 4.3.1 Factors Affecting Employment

When asked to identify the most important factors affecting the department's employment level in Ontario, respondents identified the following, ranked according to their weighted importance (see Table 7).

Results of Question 11a,b,c

## TABLE 7: FEDERAL ADMINISTRATION

SIC 909

Most Important Factors Affecting The Organizations' Employment in Ontario

| Factor | | Percent of Organizations by Employment Size: Medium (500-999) | Large (1000+) | Total |
|---|---|---|---|---|
| INTRODUCTION OF NEW TECHNOLOGY | First | 0 | 14 | 13 |
| | Second | 0 | 14 | 13 |
| | Third | 100 | 0 | 6 |
| | Weighted Importance (1) | 1.0 | 0.7 | 0.7 |
| PROGRAM DIVERSIFICATION | First | 100 | 0 | 6 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 3.0 | 0.0 | 0.2 |
| AVAILABILITY OF NECESSARY SKILLS | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.4 | 0.4 |
| ABILITY TO COMPETE | First | 0 | 0 | 0 |
| | Second | 100 | 0 | 6 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 2.0 | 0.1 | 0.3 |
| OVERALL ECONOMIC GROWTH | First | 0 | 14 | 13 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.9 | 0.8 |
| FOREIGN EXCHANGE RATE/CANADIAN COMPETITIVENESS | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.1 | 0.1 |
| PUBLIC POLICY | First | 0 | 43 | 40 |
| | Second | 0 | 43 | 40 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 2.1 | 2.0 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

| | Overall Weighted Importance |
|---|---|
| • Public policy | 2.0 |
| • Overall economic conditions | 0.8 |
| • Introduction of new technology | 0.7 |

Public policy considerations such as the number and extent of programs, levels of service, overall federal expenditure patterns, and policy decisions on staffing are seen as the critical factor which will determine future employment levels.

### 4.3.2 Employment Outlook

In 1984, there were approximately 92,300 federal public servants in Ontario (who either reside and work in Ontario (70,600) or reside in Ontario but work outside Ontario (11,700), primarily in Hull). These estimates are based an a special run by the Public Service Commission and exclude National Defense civilian employees. The Census suggest that from 1971 to 1981, Ontario employment in the federal public service (SIC 909) increased at an average annual compound rate of 2.4 percent. Survey respondents were asked to indicate their departments' employment levels for the period 1981 to 1995. The results of the survey in terms of annual compound rates of growth are shown in Table 8. The survey findings suggest a modest 1.5 percent annual employment growth rate from 1981 to 1984 and 3.5 percent from 1984 to 1985. The departments forsee zero employment growth from 1985 to 1990 and 0.5 percent per annum for 1990 to 1995. The survey suggests,

Results of Question 11d

**TABLE 8: FEDERAL ADMINISTRATION SIC 909**

**Organizations' Employment Trends in Ontario**

| Organizations by Employment Size | Total Employment and Average Annual Compound Rate of Change (1) | | | |
|---|---|---|---|---|
| | Estimated Rate | | Expected Rate | |
| | 1981-1984 | 1984-1985 | 1985-1990 | 1990-1995 |
| Medium (500-999) | 1.0 | 8.5 | 1.0 | 1.0 |
| Large (1000+) | 1.5 | 1.0 | 0.0 | 0.5 |
| Total | 1.5 | 3.5 | 0.0 | 0.5 |

(1) Rounded to closest 0.5%.

therefore, little growth over the period 1985 to 1995 relative to the period 1981 to 1985. Expert interviews indicated a similar pattern; they estimate a 1 percent per annum employment growth in the future with little change in provincial distribution based on the assumption that the policy of further decentralization of the public service out of Ottawa is on hold.

### 4.3.3 Trends in Part-Time Work

Part-time employment is not a major factor in Federal Public Administration. On the whole, the departments surveyed see little change in the current usage of part-time employment from 2.5 to 3.0 percent of total employment over the next five to ten years.

## 4.4 Changes in Occupational Structure

Table 9 shows expected trends in occupational structure (i.e., percent of total employment by occupation) in Federal Administration from 1981 to 1995 by major occupational categories and the direction of change for specific selected occupations. Respondents generally see a continuation of a number of trends that occurred from 1971 to 1981, as shown in Exhibit 6, which is derived from the data in Table 9.

Results of Question 12

## TABLE 9: FEDERAL ADMINISTRATION

SIC 909

Trends in Organizations' Occupational Structure

| Occupations | Percent of Total Employment by Selected Occupational Categories | | | | |
|---|---|---|---|---|---|
| | Estimated | | | Expected | |
| | 1981 | 1984 | 1985 | 1990 | 1995 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 39.5 | 41.5 | 42.5 | 43.0 | 43.6 |
| • Government Administrators | | + | 0 | + | 0 |
| • Government Inspectors and Regulators | | - | - | - | - |
| • Financial Officers | | + | + | + | + |
| • Personnel and Related | | + | + | + | + |
| • All Other Managerial | | + | + | - | - |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 14.5 | 14.5 | 14.7 | 15.7 | 16.3 |
| • Engineers | | - | 0 | + | 0 |
| • Scientists | | + | 0 | + | 0 |
| • Technicians and Technologists | | - | 0 | + | + |
| • Draughtsmen | | 0 | 0 | 0 | 0 |
| • Systems Analysts and Computer Programmers | | + | + | + | + |
| • All Other Natural Sciences | | - | - | - | - |
| CLERICAL | 30.4 | 30.1 | 29.2 | 28.2 | 27.3 |
| • Clerical Supervisors | | + | + | + | + |
| • Secretaries | | + | 0 | - | - |
| • Typists/Clerk Typists (includes Word Processing Operators) | | - | 0 | 0 | - |
| • Bookkeepers and Accounting Clerks | | 0 | 0 | 0 | 0 |
| • Statistical Clerks | | + | 0 | + | 0 |
| • EDP Equipment Operators | | 0 | 0 | + | + |
| • Library File Clerks | | 0 | 0 | - | - |
| • General Office Clerks | | - | - | 0 | 0 |
| • All Other Clerks | | - | - | - | - |
| OTHER OCCUPATIONS | 15.6 | 13.9 | 13.6 | 13.1 | 12.8 |
| TOTAL | 100% | 100% | 100% | 100% | 100% |

+ increase - decrease 0 no change

## EXHIBIT 6

## TRENDS IN OCCUPATIONAL STRUCTURE, 1971 TO 1995

| | Census (Actual) 1971 to 1981 | Based on Survey 1981 to 1985 | 1985 to 1990 | 1990 to 1995 |
|---|---|---|---|---|
| | Direction | | | |
| • Managerial, Administrative Related | + | + | + | + |
| • Natural Sciences, Engineering & Mathematics | + | + | + | + |
| • Clerical | - | - | - | - |
| • All others | - | - | - | - |

+ Increase
0 Little or no change
- Decrease

The degree of change anticipated in the occupational structure is not radical. Generally the change expected during the 1985 to 1995 period is similar to what took place from 1971 to 1981. The one exception is the Managerial occupations. Although this major occupational category is expected to increase from 1985 to 1995, respondents do not expect the magnitude of change experienced from 1971 to 1981 when this group increased its percent share from 21.5 percent in 1971 to 26.2 percent in 1981.

Results of Question 6

TABLE 10: FEDERAL ADMINISTRATION

SIC 909

Impact of Technology on Selected Occupations in Organizations 1985-1995

| Occupations | Percent of Organizations | | |
|---|---|---|---|
| | Oversupply | Shortage | No Response |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | |
| • Government Administrators | 14 | 40 | 46 |
| • Government Inspectors and Regulators | 14 | 13 | 73 |
| • Financial Officers | 14 | 73 | 13 |
| • Personnel and Related | 14 | 40 | 46 |
| • All Other Managerial | 46 | 27 | 27 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | |
| • Engineers | 0 | 0 | 100 |
| • Scientists | 0 | 13 | 87 |
| • Technicians and Technologists | 0 | 13 | 87 |
| • Draughtsmen | 27 | 0 | 73 |
| • Systems Analysts and Computer Programmers | 46 | 40 | 14 |
| CLERICAL | | | |
| • Clerical Supervisors | 60 | 13 | 27 |
| • Secretaries | 60 | 13 | 27 |
| • Typists/Clerk Typists (includes Word Processing Operators) | 67 | 6 | 27 |
| • Bookkeepers and Accounting Clerks | 47 | 13 | 40 |
| • Statistical Clerks | 33 | 13 | 54 |
| • EDP Equipment Operators | 54 | 13 | 33 |
| • Library File Clerks | 46 | 13 | 40 |
| • General Office Clerks | 33 | 27 | 40 |
| • All Other Clerks | 46 | 0 | 54 |
| OTHER OCCUPATIONS | 6 | 7 | 87 |

## 5.0 EMPLOYMENT EFFECTS OF NEW TECHNOLOGY

This chapter reviews the survey results from the Federal department respondents on the employment effects of new technology in terms of skills match and requirements and the impact on skill levels and job content. Training costs, particularly as they relate to new technology, are also discussed.

### 5.1 Effects on Occupations

Table 10 summarizes Federal department's expectations of technology impact on occupational requirements. The table suggests that many occupations are expected to be in short supply within individual organizations over the next ten years. The following is a list of occupations in which 35 percent or more of the departments expect a shortage of skills due to the adoption of new technology:

- Financial officers (73%),
- Government administrators (40%),
- Personnel officers (40%), and
- Systems analysts/computer programmers (40%).

The occupations in which 35 percent or more of the departments expect an oversupply of skills within their organizations due to the adoption of new technology are:

- Typists, including word processing operators (67%),
- Systems analysts and computer programmers (46%),
- Clerical supervisors (60%),
- Secretaries (60%);
- EDP equipment operators (54%),
- Bookkeepers and accounting Clerks (47%),
- Library/file clerks (46%), and
- All other clerks (46%).

Results of Question 7

**TABLE 11: FEDERAL ADMINISTRATION** SIC 909

Steps Organizations Will Likely Take to Deal With an OVERSUPPLY of Skills
1985-1995

| Occupations | Most Commonly Cited | Second Most Common | Third Most Common |
|---|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE AND RELATED** | | | |
| • Government Administrators | Attrition | Lateral Transfer | (1) |
| • Government Inspectors and Regulators | Attrition | n.a. | Retrain |
| • Financial Officers | n.a. | n.a. | n.a. |
| • Personnel and Related | n.a. | n.a. | n.a. |
| • All Other Managerial | Attrition | Lateral Transfer | Retrain |
| **NATURAL SCIENCES, ENGINEERING AND MATHEMATICS** | | | |
| • Draughtsmen | Attrition | (2) | (2) |
| • Systems Analysts and Computer Programmers | Attrition | Retrain | (1) |
| **CLERICAL** | | | |
| • Clerical Supervisors | Lateral Transfer | Retrain | Attrition |
| • Secretaries | Attrition | Lateral Transfer | Retrain |
| • Typists/Clerk Typists (includes Word Processing Operators) | Lateral Transfer | Retrain | Attrition |
| • Bookkeepers and Accounting Clerks | Retrain | Attrition | Lateral Transfer |
| • Statistical Clerks | Retrain | Attrition | Lateral Transfer |
| • EDP Equipment Operators | Retrain | Attrition | Lateral Transfer |
| • Library File Clerks | Retrain | Attrition | Lateral Transfer |
| • General Office Clerks | Retrain | Attrition | Lateral Transfer |
| • All Other Clerks | Retrain | Lateral Transfer | Attrition |
| **OTHER OCCUPATIONS** | Retrain | Attrition | (1) |

(1) Only two steps mentioned.
(2) Only one step mentioned.
n.a. no answer

Ironically, almost an equal percentage of organizations suggest an oversupply as a shortage of skills among systems analysts/ computer programmers. Respondents appear uncertain about their requirements for this group of skills and the impact of new technology on this group.

## 5.2 Likely Steps to Deal With Skills Oversupply

In dealing with a potential oversupply of skills in their organizations, the most commonly cited steps, by occupation, are shown in Table 11 and summarized below in terms of frequency cited on the table.

| | Frequency of Appearance on Table 11 | | |
|---|---|---|---|
| Response | Most Common | Second | Third |
| Attrition | 6 | 6 | 3 |
| Retraining | 7 | 3 | 3 |
| Lateral transfer | 2 | 4 | 5 |

The table shows several interesting patterns:

- In general, attrition is the preferred step for handling an oversupply of skills in the managerial, professional and technical occupations followed by lateral transfers and retraining.

- Retraining is the preferred measure for clerical and other occupations followed by attrition and lateral transfers.

- Layoffs, upgrading and down grading were not seen as important steps.

Results of Question 8

## TABLE 12: FEDERAL ADMINISTRATION

SIC 909

Steps Organizations Will Likely Take to Deal With a SHORTAGE of Skills
1985-1995

| Occupations | Most Commonly Cited | Second Most Common | Third Most Common |
|---|---|---|---|
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | |
| • Government Administrators | Retrain | Recruit | (1) |
| • Government Inspectors and Regulators | Retrain | (2) | (2) |
| • Financial Officers | Retrain | Recruit | Relocate |
| • Personnel and Related | Retrain | Recruit | (1) |
| • All Other Managerial | Retrain | (2) | (2) |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | |
| • Scientists | Upgrade | (2) | (2) |
| • Technicians and Technologists | Retrain | Recruit | (1) |
| • Systems Analysts and Computer Programmers | Recruit | Retrain | Contract Out |
| CLERICAL | | | |
| • Clerical Supervisors | Retrain | Recruit | (1) |
| • Secretaries | Retrain | Recruit | (1) |
| • Typists/Clerk Typists includes Word Processing Operators) | Retrain | (2) | (2) |
| • Bookkeepers and Accounting Clerks | Retrain | Recruit | Relocate |
| • Statistical Clerks | Retrain | Recruit | (1) |
| • EDP Equipment Operators | Recruit | Retrain | (1) |
| • Library File Clerks | Retrain | Recruit | (1) |
| • General Office Clerks | Recruit | Retrain | (1) |
| OTHER OCCUPATIONS | Retrain | Recruit | (1) |

(1) Only 2 steps mentioned.
(2) Only 1 step mentioned.

## 5.3 Likely Steps to Cope With Skill Shortages

In coping with anticipated skill shortages, the most commonly cited responses for specific occupations are shown in Table 12 and further summarized below in terms of frequency cited in the table.

| | Frequency of Appearance on Table 12 | | |
|---|---|---|---|
| Response | Most Common | Second | Third |
| Retraining | 13 | 3 | |
| Recruiting | 3 | 10 | |
| Upgrading | 1 | | |
| Contract out | | | 1 |
| Relocate | | | 2 |

Retraining is by far the most preferred measure for coping with anticipated skill shortages in virtually all occupations.

## 5.4 Technology Impact on Skill Levels and Job Content

Federal respondents were asked to rank the impact of new technologies on selected occupations in terms of:

- skills required,
- time to achieve proficiency, and
- knowledge of organizations' operations,

by indicating an increase (+), a decrease (-) or remain about the same (o). The survey results are reported in Table 13.

Exhibit 7, below, provides a further summary of the pattern of responses in terms of the consensus view of respondents on the impact of new technology on skills, time to achieve proficiency and knowledge of the organization.

Results of Question 9

**TABLE 13: FEDERAL ADMINISTRATION** SIC 909

Impact of Technology on Skill Levels and Job Content

| Occupations | Skills Required (1) Percent of Organizations | | | Time to Achieve Proficiency (1) Percent of Organizations | | | Knowledge of Organization's Operations (1) Percent of Organizations | | |
|---|---|---|---|---|---|---|---|---|---|
| | + | - | 0 | + | - | 0 | + | - | 0 |
| **MANAGERIAL, ADMINISTRATIVE AND RELATED** | | | | | | | | | |
| • Government Administrators | 100 | 0 | 0 | 50 | 17 | 33 | 38 | 15 | 47 |
| • Government Inspectors and Regulators | 67 | 0 | 33 | 25 | 50 | 25 | 50 | 25 | 25 |
| • Financial Officers | 100 | 0 | 0 | 33 | 33 | 34 | 47 | 15 | 38 |
| • Personnel and Related | 82 | 0 | 18 | 50 | 17 | 33 | 62 | 0 | 38 |
| • All Other Managerial | 82 | 0 | 18 | 60 | 0 | 40 | 64 | 18 | 18 |
| **NATURAL SCIENCES, ENGINEERING AND MATHEMATICS** | | | | | | | | | |
| • Engineers | 33 | 0 | 67 | 0 | 0 | 100 | 0 | 0 | 100 |
| • Scientists | 50 | 0 | 50 | 0 | 0 | 100 | 0 | 0 | 100 |
| • Technicians and Technologists | 33 | 0 | 67 | 0 | 25 | 75 | 25 | 0 | 75 |
| • Draughtsmen | 0 | 0 | 100 | 0 | 50 | 50 | 50 | 0 | 50 |
| • Systems Analysts and Computer Programmers | 40 | 20 | 40 | 33 | 50 | 17 | 50 | 0 | 50 |
| **CLERICAL** | | | | | | | | | |
| • Clerical Supervisors | 63 | 0 | 37 | 50 | 17 | 33 | 69 | 0 | 31 |
| • Secretaries | 69 | 0 | 31 | 46 | 27 | 27 | 54 | 0 | 46 |
| • Typists/Clerk Typists (includes Word Processing Operators) | 33 | 0 | 67 | 8 | 37 | 55 | 37 | 0 | 63 |
| • Bookkeepers and Accounting Clerks | 60 | 0 | 40 | 17 | 17 | 66 | 33 | 0 | 67 |
| • Statistical Clerks | 63 | 0 | 37 | 38 | 16 | 46 | 31 | 0 | 69 |
| • EDP Equipment Operators | 55 | 0 | 45 | 20 | 20 | 40 | 18 | 0 | 82 |
| • Library File Clerks | 55 | 0 | 45 | 0 | 40 | 60 | 18 | 0 | 82 |
| • General Office Clerks | 75 | 0 | 25 | 20 | 40 | 40 | 40 | 0 | 60 |
| • All Other Clerks | 50 | 0 | 50 | 0 | 33 | 67 | 67 | 0 | 33 |

+ increase - decrease 0 remain the same

(1) Non-responses excluded.

**EXHIBIT 7**

**GENERAL CONSENSUS ON IMPACT OF NEW TECHNOLOGY**

| | Skills | Time | Knowledge |
|---|---|---|---|
| • Managerial, Administrative and Related | + | + | + |
| • Natural Sciences, Engineering and Mathematics | o | o | o |
| • Clerical | + | o | o |

+ Increase
o Remain the same
- Decrease

There are, however, prominent exceptions to these general patterns, namely:

- Draftsmen will require fewer skills within the same or less time to achieve proficiency but will need to have a better understanding of the organization.

- Systems analysts/computer programmers, clerical supervisors and secretaries will need more skills, less time to become proficient and need to more knowledge of the organization.

## 5.5 Training Costs and New Technology

Federal Government managers estimate that they currently spend, on average, the equivalent of 3 percent of total labour costs on training and they expect this to increase to 4 percent over the next ten years.

Currently about 30 percent of this training is related to new technology. Over the next five to ten years, the portion related to new technology will increase to about 45 percent.

TABLE 14

INDUSTRIAL RELATIONS: FEDERAL ADMINISTRATION

| UNION | NUMBER OF EMPLOYEES | MAJOR EMPLOYER* | LOCATION | TECHNICAL CHANGE CLAUSE IN AGREEMENT |
|---|---|---|---|---|
| PUBLIC SERVICE ALLIANCE | | TREASURY BOARD OF CANADA | | |
| | 29,613 | Clerical and Regional Group | Province-wide | Advance Notice and Consultation |
| | 11,638 | Secretarial, Stenography and Typing | Province-wide | Advance Notice and Consultation |
| | 9,335 | Programme Administration Group | Province-wide | Advance Notice and Consultation |
| | 5,655 | General Labour and Trades | Province-wide | Advance Notice, Consultation and Training |
| | 5,082 | General Services Group | Province-wide | Advance Notice and Consultation |
| | 3,740 | Administrative Services Group | Province-wide | Advance Notice and Consultation |
| | 2,960 | Engineering and Scientific Support Group | Province-wide | Advance Notice and Consultation |
| | 2,736 | General Technical, etc. | Province-wide | Advance Notice and Consultation |
| | 2,200 | Data Processing Group | Province-wide | Advanced Notice and Consultation |
| | 1,370 | Drafting and Illustration Group | Province-wide | Advance Notice, Consultation and Training |
| | 1,285 | Purchasing and Supply | Province-wide | Advance Notice, Consultation and Training |
| | 1,261 | Auditing Group | Province-wide | Consultation and Training |
| | 1,150 | Hospital Services Group | Province-wide | Advance Notice and Consultation |
| | 1,076 | Financial Administration Group | Province-wide | Consultation |
| PROFESSIONAL INSTITUTE OF PUBLIC SERVICE OF CANADA | | TREASURY BOARD OF CANADA | | |
| | 1,755 | Computer Systems Group | Province-wide | Advance Notice and Consultation |
| | 1,288 | Engineering and Land Survey Group | Province-wide | N/A |
| | 1,014 | Commerce Group | Province-wide | N/A |
| | | NATIONAL RESEARCH COUNCIL | | |
| | 1,005 | Resident Officers Group | Ottawa | N/A |
| | | TREASURY BOARD OF CANADA | | |
| | 1,000 | Scientific Research Group | Province-wide | N/A |
| ECONOMISTS, SOCIOLOGISTS, STATISTICIANS ASSOCIATION | | TREASURY BOARD OF CANADA | | |
| | 2,217 | Economic and Social Statistics Group | Province-wide | N/A |
| CANADIAN PROFESSIONAL AND TECHNICAL EMPLOYEES | | TREASURY BOARD OF CANADA | | |
| | 1,113 | Translation Group | Province-wide | N/A |

* Employer with a union agreement covering 1,000 employees or more. The union agreements above represent 86 percent of unionized employees.

N.A. Information not available in Ontario Ministry of Labour data base.

SOURCE: Collective Bargaining Agreement Systems, Ontario Ministry of Labour.

## 6.0 LABOUR RELATIONS ENVIRONMENT

This chapter discusses briefly the historical industrial relations environment in the Federal Government public service and reviews the survey results of departments and unions in Federal Administration regarding the labour relations environment with emphasis on technology change.

### 6.1 Industrial Relations Environment: Historical

Approximately 85 percent of the 1984 Federal Public Administration work force in Ontario was unionized, but coverage in the event of technological change is limited (see Table 14). The Public Service Alliance of Canada is the largest union, accounting for 83 percent of all unionized employees in Ontario. Other unions, ranked in decreasing order of representation, include the following:

- Professional Institute of Public Service of Canada (8,994 employees),
- Economists, Sociologists and Statisticians Association (2,217 employees), and
- Canadian Union of Professional and Technical Employees (1,460 employees).

In addition, (again, ranked in order of decreasing representation), are the following unions, with less than 1,000 federal public service employees in Ontario:

- Independent Local Union,
- Electrical Workers (IBEW),
- Multi-Union,
- Air Traffic Controllers, and
- Merchant Service Guild.

## 6.2 Trends in Unionization

The survey results indicated that approximately 85 percent of the federal departments' employees are members of a union. The departments anticipate a slight decrease in union representation among their employees to 83 percent in 1990 and 1995. This slight decline is presumably due to increases in managerial occupations.

## 6.3 Technology Change Clauses

Of the departments surveyed, approximately 80 percent of the union contracts in Federal Administration have a technology change clause. The following exhibit presents unweighted data from the survey of eight departments by the three largest unions in Federal Administration.

**EXHIBIT 8**

**UNIONS AND TECHNOLOGICAL CHANGE**

| | Public Service Alliance of Canada | Professional Institute of Public Service of Canada | Economists, Sociologists, & Statisticians Associations |
|---|---|---|---|
| Percent of Contracts with a Technology Change Clause | 100% | 88% | 29% |
| Percent of Technology Clauses Covering: | | | |
| Notice/Disclosure | 75% | 100% | 0% |
| Consultation/ Participation | 100% | 71% | 100% |
| Joint Technology Change Committee | 25% | 29% | 0% |
| Job Security | 0% | 14% | 0% |
| Seniority | 0% | 0% | 0% |
| Retraining | 13% | 0% | 0% |
| | N* = 8 | N* = 8 | N* = 7 |

*N is number of departments that report having employees in these unions.

Exhibit 8, based on the departments surveyed, suggests that:

- All contracts with Public Service Alliance of Canada (PSA) have a technology change clause and that all contracts cover prior consultation, most (75%) have a requirement for advance notice, about 25 percent have a provision for a joint technology change committee and less than 15 percent of the clauses include a reference to retraining.

- Most (88%) of the contracts with the Professional Institute of Public Service of Canada (PIPS) have a technology change clause. Of those with such clauses, all of them have a requirement for advance notice, about 70 percent cover prior consultation, about 30 percent cover have provision for a joint technology change committee and about 15 percent cover job security.

- About 30 percent of the contracts with the Economists, Sociologists and Statisticians Association have a technology change clause and of these, the only feature they cover is a commitment to prior consultation.

It is worth noting that the issue of technology change is not handled in collective bargaining at the departmental level but is rather dealt with centrally by Treasury Board and collective bargaining agents through the National Joint Council. Consultation regarding technology change does, however, occur at the local level.

Department managers, when asked if the technology change clauses are effectively administered, all responded affirmatively. Federal Administration union participation in the study was limited. One of the union respondents answering negatively to this question explained:

> "Generally notice is not given by the employer and no consultation takes place. This is primarily due to the weak wording of the technological change clause in the contract. There has always been disagreement on what in fact is a major technological change. As a result, changes are made without notice or consultation."

## 6.4 Managements' Perception of their Union's Position on New Technology

Management and union respondents were asked an open-ended question on what the union's position has been on the adoption of new technologies.

In 50 percent of the managers' responses, they acknowledge that the union(s) accepts the need for technological change. The most frequently named concerns of the union, as perceived by the federal managers surveyed, were, in order of frequency mentioned:

- Job security,
- Job content/design/classification,
- Health and safety, and
- Training.

Union respondents in the survey and expert labour interviews with union leaders all acknowledged the need to adopt new technology. Retraining, suitable consultation and health and safety concerns were most frequently named in the union interviews.

## 6.5 Nature of Worker Involvement in the Process of Technological Change

Federal departments were asked to indicate whether they had a formal mechanism for employee participation in:

- Setting production targets at various levels in the organization,
- Improving productivity/quality, and
- Adopting new technology.

The survey results suggest that:

- About 40 percent of the departments report having formal mechanisms for employee participation in setting production targets;
- About 55 percent report having formal mechanisms for improving productivity or quality;
- About 85 percent report having formal mechanisms related to the adoption of new technologies.

Union respondents in the survey answered negatively to such mechanisms being in place. Although the number of union respondents was limited, their responses suggest a different perception of employee participation than the managers surveyed.

## 6.6 Views on Involving Workers in Decisions on Adopting New Technology

Respondents were asked an open-ended question as to what extent and how should management involve employees in decisions on adopting new technology. The pattern of responses suggest that:

- Many department respondents (about 40 percent) believe some form of prior consultation is essential to successful implementation.

- Joint committees and task forces to solve specific problems were suggested by about a third of the department representatives.

- Some form of consultation was cited by all respondents.

Union respondents also cited the need for open consultation on such aspects as choice of equipment, job content and retraining requirements.

## 7.0 PLANNING FOR TECHNOLOGICAL CHANGE

The following chapter discusses the survey findings of federal departments related to questions on planning for technological change. Table 15 summarizes the results.

Of the departments surveyed, 87 percent report having a long term strategic plan or multi-year operational plan.

An equal number report having a plan dealing with future human resource needs. The length of the planning horizon for these plans is three to five years.

Approximately 90 percent of the departments report having a capital investment plan dealing with the adoption of new technologies. The average length of the planning horizon for these plans is five years.

Departments were asked to indicate the degree of integration between their human resource and capital investment plans as they relate to new technology. They were asked to use a scale of 1 - "not at all integrated" to 5 - "highly integrated". A rating of 3, in the middle of the scale, would, therefore, represent a fair degree of integration. The pattern of responses indicates a modest degree of integration between the two plans. On average the departments rated the degree of integration at 2.1.

Results of Question 18

## TABLE 15: FEDERAL ADMINISTRATION

SIC 909

Planning for Technological Change

| Organizations by Employment Size | Strategic Plan | Human Resource Plan | | Capital Investment Plan | | Perceived Integration Between Capital and Human Plans (1) |
|---|---|---|---|---|---|---|
| | Percent of Organizations With Plan | Percent of Organizations With Plan | Length of Planning Horizon | Percent of Organizations With Plan | Length of Planning Horizon | |
| Medium (500-999) | 100 | 100 | n.a. | 100 | 7 years | 3.0 |
| Large (1000+) | 86 | 86 | 4 years | 86 | 5 years | 2.0 |
| Total | 87 | 87 | 4 years | 87 | 5 years | 2.1 |

(1) Using a scale of 1 to 5; 1 represents "Not at all integrated" and 5 "Highly integrated".
n.a. no answer

## SECTION II - PROVINCIAL ADMINISTRATION

## PART II - HISTORICAL TRENDS 1971-1984

### 2.0 INTRODUCTION

This section of the report provides a brief historical analysis of Provincial Administration in Ontario for the periods 1971 to 1981 and 1982 to 1984.

### 2.1 The Structure of the Organization

The Provincial Government is responsible for social and economic development of the province and the administration of justice at the provincial and local level. Many of its activities overlap with those of the federal government and it delivers many services (health and education) with the financial assistance of the federal government. In addition, the Provincial Government has extensive responsibility to oversee municipal governments and local agencies.

The province of Ontario spent $24.6 billion in fiscal year 1983-84 and it employed 114,067 people in calendar year 1983.

The Provincial Government has broad powers of taxation (Appendix D, Table D.11). About 28 percent of 1983-84 revenues come from the personal income tax (a joint system shared with the federal government). Another 18 percent comes from the retail sales tax and 15.6 percent comes from an assortment of fees for services - health insurance premiums, liquor sales, vehicle registrations,

etc. Finally, 19.5 percent of revenue comes from transfers from the federal government.

The main determinants of the growth of revenue of the province are:

- Real growth in the economy, that is, the growth in personal and corporate incomes, the rise in retail sales and sales of liquor, tobacco and gasoline.

- The willingness of the province to increase tax rates. Taxes have risen quickly over the past decade - from $581 per capita in 1971 to $1,927 per capita in 1982[1], an average annual increase of 11.5 percent. But taxpayers have become resistant to further increases.

- The rate of inflation which affects the rate of increase in incomes and in the value of sales. However, the personal income tax is automatically indexed for inflation so that tax burdens do not rise because of increases in prices.

The main areas of expenditure outlined in Table D.12 are:

- Social development (63.8 percent). This category includes health and education services which are not part of general government activity and are therefore excluded from SIC 931. However, it is not possible to examine the overall financial position of the Provincial Government without including these two important areas which accounted for 30.9 percent and 14.0 percent respectively of total expenditures in fiscal year 1983-84.

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1. Revenues excluding intergovernmental transfers. Based on Statistics Canada, Provincial Economic Accounts, Cat. No. 13-213.

- Resources development (15.7 percent of total expenditure). This includes a wide variety of provincial programs intended to promote a stronger economic performance through transportation, housing, environment, agriculture, etc.

- Public debt interest (10.3 percent, up from 7.3 percent in 1973-74). This is the fastest growing area of expenditure. The share of the other main groups of expenditure declined over the ten years ending in 1983-84.

- Justice policy (3.7 percent). This includes the administration of justice and the regulation of commercial activities.

- General government (6.5 percent). This includes the management of Provincial Government affairs.

The key determinants of growth on Provincial Administration expenditures are:

- The size and composition of the population. Population growth in Ontario is decelerating from an average of 1.3 percent per year from 1970 to 1979 to an expected rate of 0.8 percent from 1980 to 1989. The maturing age structure of the population is shifting the demand for expenditures from a youth orientation to more support for the elderly.

- The performance of the economy. The trend to slower economic growth and high unemployment tends to increase expenditure in two ways and reduce it in one way. The pressure to curb provincial activity occurs because slower increases in incomes and retail trade mean slower growth in provincial revenue which reduces the flow of funds available to finance government outlays. In contrast, higher unemployment encourages more activity, first, to support those affected by unemployment, and, second, to foster a more vigorous economy through support for industry and job creation.

- The political preferences of the party in power. Some parties will be more activist than others, depending on their ideology.

## 2.2 The Market Environment

The Provincial Government faces a similar predicament to that of the federal government in the sense that the province has a clear tendency to spend more than it collects in revenue. Net consolidated public debt outstanding has increased from $15.5 billion in 1973-74 to $41.2 billion in 1983-84 and debt charges on direct public debt have increased from $525 million in 1973-74 to $2.1 billion in 1983-84 (see Table D.13). Net public sector debt encompasses all the debts of provincial and local governments and their agencies, including Ontario Hydro. They are combined because they borrow on the basis of a guarantee by the province. Direct debt is the debt actually issued by the province. It accounts for about half of the total public sector debt outstanding.

However, the Provincial Government does not carry the rank of sovereign debtor in the financial markets because it does not have the power to print money the way the federal government does. There are also greater perceived constraints on the province's ability to raise taxes (although Ontario's power to tax is quite broad compared to junior levels of government of other countries). Consequently, Ontario must manage its finances with one eye on the credit rating evaluations made by such agencies as Moody's and Standard and Poors. These ratings have a strong influence on the interest rates required to attract lenders to buy Ontario bonds. In that sense, there is a market constraint on the growth of provincial activity.

That market constraint has had an impact on the formation of provincial budget policy over the past decade. The budget of April 7, 1975, was one of the earliest in Canada to introduce expenditure restraint, and one of the main motivations for that budget was the financial markets' concern about the growth of the provincial debt burden. During the past decade, net public sector debt as a percent of gross provincial product has fluctuated between 29 and 31 percent (see Table D.13). It exceeded the 31 percent level for the first time in fiscal 1984-85.

There are three other factors acting as a constraint in the Provincial Government's growth. The first is the desire of the federal government to cut back on transfers to the provinces which rose from 18.5 percent of total revenue in 1973-74 to 19.5 percent in 1983-84 (Table D.11). These transfers constitute a major outlay of the federal government (about 20 percent of total expenditures),[1] so it would be difficult for Ottawa to reduce its own deficit without curtailing these transfers.

The second financial constraint arises from the current deficit of the Provincial Government combined with taxpayer resistance to higher taxes. Table D.14 shows that the province now collects the equivalent of $1,927 per capita in revenues. It also incurs a deficit of $291 per capita, meaning that revenues from all sources would have to be raised by 15 percent in order to eliminate the deficit. Taxpayers meanwhile have suffered a period of income restraint because prices have been rising at a faster rate than wages. They are therefore unwilling to absorb a higher tax burden.

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1. Canadian Tax Foundation, The National Finances, 1983-84, pp. 312-315.

Since the province's debt is already running at levels that test the market constraint described earlier, the province is in a situation where it must seek cost-savings and/or efficiency gains in order to stabilize its financial position. At the same time, there are strong pressures to increase spending to alleviate the effects of unemployment and to meet the growing needs of an aging population. This conflict in pressures is summarized in the matrix in Table D.15.

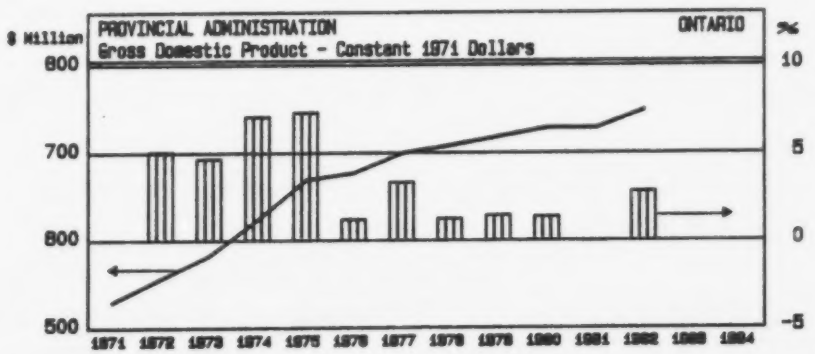
## 2.3 Industry Trends

Tables D.16 to D.19 present key sectoral indicators for the years 1971 to 1984.

### 2.3.1 Aggregate Output

Gross domestic product for Provincial Administration in Ontario increased from $529 million in 1971 to $1,941 million in 1981, an annual average rate of increase of 13.9 percent (Tables D.16 and D.17). Output increased by 12.1 percent in 1982 to reach $2,175 million.

**EXHIBIT 9**



Constant dollar gross domestic product increased from $529 million in 1971 to $728 million in 1981, an average annual rate of increase of 3.2 percent. The increases were strong from 1971 to 1975 and then slowed considerably in the second half of the decade. There was no increase at all in 1981 and then an increase of 2.8 percent in 1982, when constant dollar GDP reached $748 million.

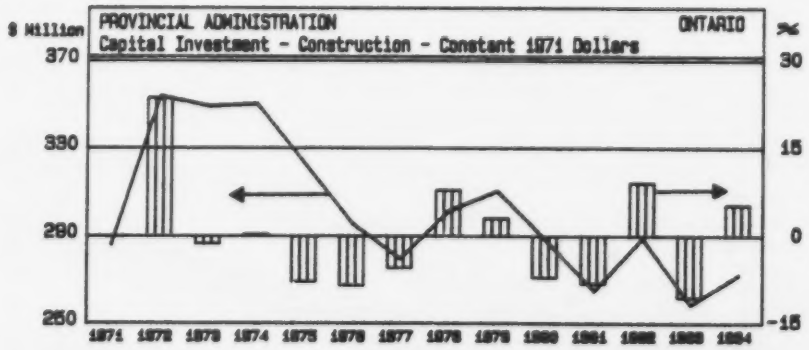
### 2.3.2 Competitive Position

No measure of competitiveness or efficiency is available for Provincial Administration.

### 2.3.3 Capital Investment

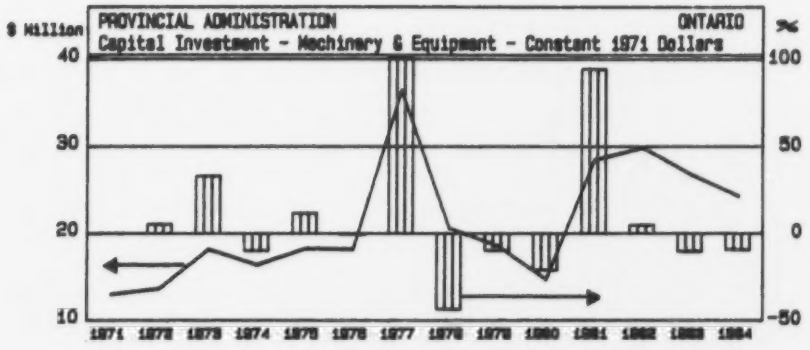
Current dollar investment increased from $299 million in 1971 to $761 million in 1981, an average annual gain of 9.8 percent. Investment increased at an average rate of 4.2 percent from 1981 to 1984, reaching an anticipated $860 million in 1984. Construction outlays accounted for more than 90 percent of total investment throughout this period.

EXHIBIT 10



Constant dollar investment fell from $299 million in 1971 to $293 million in 1981, an annual average decline of 0.3 percent. It then rose in 1982, decreased in 1983 and rose again in 1984, reaching $296 million in 1984. The construction component followed the same pattern, declining at an average annual rate of 0.8 percent from the 1971 level of $286 million to the $265 million level in 1981. Over the period 1981 to 1984 an average annual gain of 0.9 percent brought construction investment to the expected $272 million level.

**EXHIBIT 11**



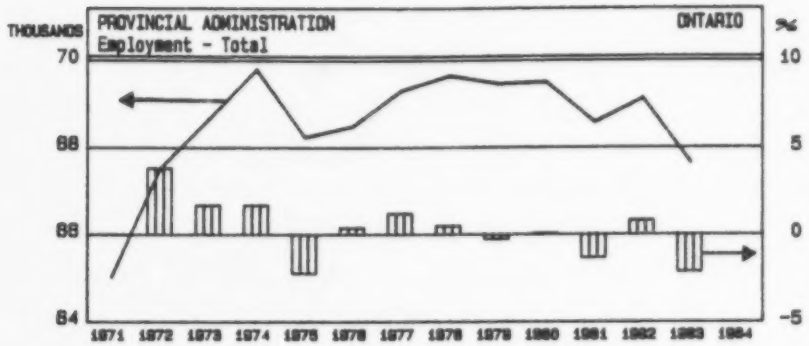

Constant dollar investment in machinery and equipment by the province was low throughout the period under study. It amounted to $13 million in 1971, rose to a peak of $36 million in 1977, then dropped sharply until 1981. Since 1981, machinery and equipment spending has fluctuated between $24 and $30 million.

### 2.3.4 Employment

The discussion of employment includes an analysis of aggregate trends and occupational changes.

- Aggregate Trends

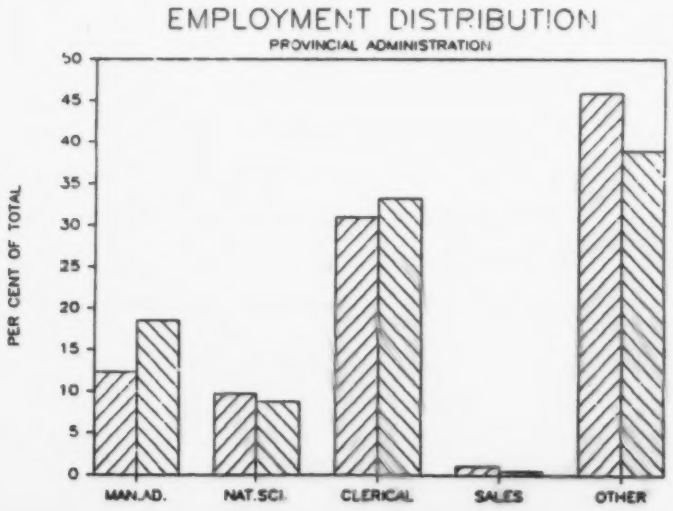
**EXHIBIT 12**




Total employment in the Provincial Government increased from 65,018 in 1971 to 68,554 in 1981, an average annual rate of increase of 3.1 percent (see Tables D.16 and D.17). As the chart shows, most of this increase occurred between 1972 and 1974. Employment actually declined in 1975 and 1979 and again in 1981. Employment increased by 0.8 percent in 1982 and fell by 2.1 percent in 1983, reaching 67,629 in 1983.

- Occupational Changes

**EXHIBIT 13**



Census data on Provincial Administration show a smaller universe than the aggregate data cited above. The census shows 65,840 employees in 1981 and indicates that employment grew by 1.9 percent per year from 1971 to 1981 (see Table D.20). Managerial and Administrative personnel increased at an average rate of 6.2 percent, much faster than the overall average. Clerical and related workers increased by 2.6 percent. The large Other category included over 10,000 service-related employees (police officers, security personnel, etc.) and almost 6,000 social service employees (social workers, etc.).

At the more detailed occupational level, the following patterns emerge:

- In the Managerial and Administrative group, five types of occupations grew faster than the sectoral average of 1.9 percent. Three of these are Administrative positions that are difficult to differentiate: government administrators (up 5.4 percent), occupations related to management and administration (up 7.3 percent) and officials and administrators unique to government (up 16.0 percent). Two more specialized groups, inspectors and regulatory officers and accountants, auditors and other financial officers increased by 3.0 and 3.2 percent respectively.

- In clerical and related occupations, the fastest growth occurred for electronic data processing operators (8.2 percent), bookkeepers and accounting clerks (5.8 percent), other clerical occupations (4.2 percent) and secretaries and

stenographers (3.3 percent). The number of typists and clerk-typists actually declined by 1.1 percent between 1971 and 1981.

Female representation in Provincial Administration increased from 33.6 percent in 1971 to 42.5 percent in 1981 (see Table D.21). The greatest increase in the number of jobs for women occurred in Clerical and Related occupations where female representation increased from 72.0 percent in 1971 to 78.7 percent in 1981. These gains were most noticeable in jobs for secretaries and stenographers and for bookkeepers and accounting clerks.

There was also a significant increase in jobs for women in Managerial and Administrative occupations where female representation rose from 10.9 percent in 1971 to 23.0 percent in 1981. These gains occurred mainly in general administrative occupations, not in specialized professional jobs.

## PART III - FUTURE TRENDS: THE SURVEY RESULTS

Part III of this study presents the survey results which discuss organizations' surveyed opinions as to future trends in technology adoptions and employment impacts.

### 3.0 ADOPTION OF NEW TECHNOLOGY

This chapter reviews the expected trends in the adoption of new technologies in the Provincial Public Administration and the factors driving the need to adopt and affecting the rate of technology adoption. Again, the discussion incorporates both the survey results and the expert interview process where appropriate.

### 3.1 New Technologies and Rates of Adoption

Ontario's approach to the use of computers was set out for the first time in Study Number 5 of the Committee on Government Productivity set up in 1974. That policy framework called for a highly centralized computer installation which was not entirely successful. The policy was subsequently revised to enable departments and agencies to set up their own computer systems. Some of these are considered unique and highly creative, although many offices are still struggling with manual record systems.

The rate of adoption has been slowed by two periods of expenditure restraint (1975 to 1978 and 1982 to 1984) which seriously curtailed funds for purchase of equipment.

The Ontario Provincial Government has recently undertaken a provincial government-wide technology planning process analogous to the Federal Informatics Task Force. The Interministerial Information Technology Strategy Project includes eight project teams of senior civil servants with representation from virtually every ministry. The scope of the project includes a wide variety of information technologies (computers, electronic data processing, used to create, store, transmit and process all forms

of information, analog and digital communications and office automation) as well as such non-technology considerations as human resources, organization, environment and finance. The project's objectives are to develop provincial government-wide strategic policies, guidelines and standards for the use of information technology. The project's recommendations are currently scheduled to be dealt with by the Ontario Management Board in the coming months.

This project, along with individual manager's efforts to deal with increased service demands under restraint, may well propel the Ontario Government into a technology leader position relative to the federal and local governments.

Table 16 summarizes the survey results of the Ontario provincial ministries in terms of the percentage of ministries who have adopted representative new technologies before 1985 and their expectations for doing so in the near-term and mid-term.

In general, larger ministries (i.e., those with 1,000 or more employees) have more widely adopted the new technologies than medium sized ministries (i.e., those with 200 to 999 employees). However, by 1990, the medium sized ministries expect to have most of the commercially proven technologies in use. Similar to the survey of Federal Administration, the Provincial Administration sample size included seven larger ministries and only one medium sized ministry. The sample, therefore, limits the ability to draw conclusions about variations in technology adoption by employment size.

Overall, based on the pattern of responses, ministries appear to be relatively confident about their technology plans for the near-term but less clear about the period 1990 to 1995.

### 3.1.1 Service Delivery Technologies

- All the larger ministries already have on-line client data bases and all ministries expect to by 1990.

Results of Question 3

## TABLE 16: PROVINCIAL ADMINISTRATION

SIC 931

Percent of Organizations Planning to Adopt New Technologies by Employment Size (1)

| Technologies | Before 1985 | | | 1985-1990 | | | 1990-1995 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Medium | Large | Total | Medium | Large | Total | Medium | Large | Total |
| **SERVICE DELIVERY TECHNOLOGIES** | | | | | | | | | |
| On-Line Client Data Bases | 0 | 100 | 92 | 100 | - | 8 | - | - | - |
| Direct Data Entry from Field | 0 | 71 | 67 | 100 | 43 | 47 | - | - | - |
| Electronic Processing of Service Requests (e.g. test claim validity) | 0 | 43 | 40 | - | 43 | 40 | - | - | - |
| Electronic Service Delivery | 0 | 29 | 27 | - | 57 | 53 | - | - | - |
| Computerized Inventory Control | 100 | 29 | 33 | - | 43 | 40 | - | - | - |
| **DESIGN TECHNOLOGIES** | | | | | | | | | |
| Computer-Aided Design (CAD) | 0 | 14 | 13 | 100 | 14 | 20 | - | - | - |
| Computer-Aided Engineering (CAE) | 0 | 14 | 13 | 100 | 14 | 20 | - | - | - |
| Computer-Aided Mapping | 0 | 29 | 27 | - | 29 | 27 | - | - | - |
| Computer-Aided Project Management | 0 | 71 | 67 | - | 29 | 27 | - | - | - |
| 4th Generation Computer Languages | 0 | 57 | 53 | 100 | 57 | 60 | - | 14 | 13 |
| Other | 0 | 14 | 13 | - | 14 | 13 | - | - | - |
| **OFFICE AUTOMATION TECHNOLOGIES** | | | | | | | | | |
| Mainframe/Minicomputers | 0 | 100 | 93 | 100 | 14 | 20 | - | - | - |
| Word Processing | 100 | 100 | 100 | - | 29 | 27 | - | 14 | 13 |
| Microcomputers | 100 | 100 | 100 | - | 29 | 27 | - | 14 | 13 |
| Data Base Services (External) | 100 | 71 | 73 | - | 29 | 27 | - | - | - |
| Electronic Filing | 0 | 57 | 53 | 100 | 57 | 60 | - | - | - |
| Internal Data Base Management Systems | 0 | 100 | 93 | 100 | 14 | 20 | - | - | - |
| Local Area Networks (LANs) | 0 | 33 | 31 | 100 | 71 | 73 | - | - | - |
| Computerized Decision Support Systems | 0 | 57 | 53 | 100 | 71 | 73 | - | - | - |
| Voice Activated Computers | 0 | 0 | 0 | - | 43 | 40 | 100 | 43 | 47 |
| Artificial Intelligence/Expert Systems | 0 | 0 | 0 | - | 14 | 13 | 100 | 71 | 73 |
| Fully Integrated Work Stations | 0 | 0 | 0 | 100 | 86 | 87 | - | 14 | 13 |
| **TELECOMMUNICATIONS TECHNOLOGIES** | | | | | | | | | |
| Private Automatic Branch Exchange (PABX) | 0 | 57 | 53 | 100 | 57 | 60 | - | 14 | 13 |
| Electronic Mail | 0 | 43 | 40 | 100 | 57 | 60 | - | - | - |
| Voice Mail | 0 | 29 | 27 | 100 | 43 | 47 | - | 14 | 13 |
| Facsimile with Built-In Microprocessor (FAX) | 0 | 43 | 40 | 100 | 71 | 73 | - | - | - |
| Satellite/Microwave Systems | 0 | 14 | 13 | - | 29 | 27 | - | 14 | 13 |
| Videotex | 0 | 29 | 27 | - | 57 | 53 | - | 14 | 13 |
| Video Conferencing | 0 | 57 | 53 | 100 | 57 | 60 | - | 14 | 13 |
| Fibre Optics | 0 | 0 | 0 | 100 | 71 | 73 | - | 14 | 13 |

(1) '0' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey, are not planning to adopt this technology or 'don't know'. Responses are not mutually exclusive.

- By 1990, all the ministries expect to have some form of on-line client access to ministry data bases.

- Over two-thirds of the ministries already have some form of direct data entry from the field and all expect to have this feature by 1990.

- Some form of electronic service delivery and electronic processing of service requests is already in 27 percent and 40 percent of the ministries, respectively and by 1990, 80 percent of the ministries expect to be using such technology applications.

### 3.1.2 Design Technologies

- In those ministries where CAD, CAE, and computer-aided mapping and project management are applicable, two out of three ministries already are using such technologies. By 1990, all ministries, where these are applicable, expect to be using these technologies. Similarly, the respondents expect these technologies to become increasingly common within their ministries.

- 4th generation computer languages are already being used by over 50 percent of the ministries and the remainder expect to be by 1995. Computer-aided software development was an additional technology, not on the questionnaire, cited by respondents.

### 3.1.3 Office Automation Technologies

- The use of computers (mainframes, micros and minis), word processing, and internal data base management systems are already used by virtually all ministries with a significant increase in diffusion within the ministries expected over the next five years.

- By 1990, 100 percent of the ministries expect to be using LANs to link electronic office machines and systems.

- Over 70 percent of the ministries currently use external data base services with the remaining ministries expecting to by 1990.

- Over 50 percent of the ministries use electronic filing and by 1990 all ministries will.

- Fully integrated work stations are expected to be adopted by 87 percent of the ministries in the near-term with the remaining ministries expecting to in the mid-term.

- Expert systems are seen as a mid-term technology and by 1995, all of the ministries expect to be using some form of expert systems technology.

### 3.1.4 Telecommunications Technologies

- PABXs are currently used by more than 50 percent of the ministries and all the ministries expect to by 1995.

- Electronic mail and "smart" FAX machines are currently being used by 40 percent of the ministries and are expected to be used by the rest by 1990.

- Voice mail and videotex are currently being used by over 25 percent of the ministries, and, by 1990, approximately 75 percent of the ministries expect to.

- Video conferencing is currently being used by over 50 percent of the ministries and virtually all ministries expect to be using this technology to enhance interregional communication within the decade.

- Over 70 percent of the ministries expect to be using some form of fibre optics application by 1990.

The coincidence of the Interministerial Information Technology Strategy Project with the timing of the survey appears to have stimulated and advanced the ministries' senior managers in their thinking about possible uses of new technology in the near-term period.

## 3.2 Forces Driving the Need to Adopt New Technology

Table 17 summarizes the survey results of the ministries when asked to identify the three most important factors driving their need to adopt new technology. The weighted importance of each is also shown. The most commonly cited factors are as follows.

| | Overall Weighted Importance |
|---|---|
| • Increase productivity | 2.2 |
| • 'Clients' demands/requirements | 1.0 |
| • Lower costs | 0.7 |
| • Increase skills of organization | 0.7 |

A clear pattern emerges. The need to increase productivity (and lower costs) is the single most dominant force followed by the need to enhance organizational skills and meet increasingly sophisticated client requirements. Provincial managers appear to

Results of Question 4

## TABLE 17: PROVINCIAL ADMINISTRATION

SIC 931

Most Important Factors Driving The Need to Adopt New Technologies

| Factor | | Percent of Organizations by Employment Size | | |
|---|---|---|---|---|
| | | Medium (200-999) | Large (1000+) | Total |
| COMPETITIVE PRESSURES | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance (1) | 0.0 | 0.3 | 0.3 |
| CUSTOMER DEMANDS FOR CHANGES | First | 100 | 0 | 7 |
| | Second | 0 | 29 | 27 |
| | Third | 0 | 29 | 27 |
| | Weighted Importance | 3.0 | 0.9 | 1.0 |
| INCREASE PRODUCTIVITY | First | 0 | 57 | 53 |
| | Second | 0 | 29 | 27 |
| | Third | 100 | 0 | 7 |
| | Weighted Importance | 1.0 | 2.3 | 2.2 |
| INCREASE QUALITY | First | 0 | 0 | 0 |
| | Second | 100 | 14 | 20 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 2.0 | 0.4 | 0.5 |
| INCREASE MANAGEMENT INFORMATION | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.4 | 0.4 |
| LOWER COSTS | First | 0 | 14 | 13 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.7 | 0.7 |
| INCREASE SKILLS/ ORGANIZATIONAL CAPABILITY | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 29 | 27 |
| | Weighted Importance | 0.0 | 0.7 | 0.7 |
| ALL OTHERS | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.1 | 0.1 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

have a clear, consistent view of technology and are looking at it to satisfy increased service demands under fiscal restraint and staffing restrictions.

## 3.3 Factors That Could Slow The Rate of Technology Adoption

The factors that could slow the rate at which provincial ministries adopt new technology are summarized in Table 18. A short list of three main factors were identified.

| | Overall Weighted Importance |
|---|---|
| • Ability to finance | 1.9 |
| • Lack of skills/know-how | 1.8 |
| • Unwillingness to change | 0.9 |

Provincial managers were again relatively cohesive in their responses. Money to pay for technology is the key retarding factor followed closely by a lack of skills and know-how to implement the new technology. Expert interviews revealed that the province cannot offer competitive salaries for the skilled people it requires or will require to adopt new technology. Lastly, the lack of willingness to change was cited as a key secondary retarding factor. The expert interviews suggest that the lack of willingness to change is usually at the most senior levels of management. Once again, as with the Federal Administration, employee acceptance and union resistance were ranked as insignificant retarding factors.

Results of Question 5

## TABLE 18: PROVINCIAL ADMINISTRATION

SIC 931

Most Important Factors that Could Slow the Rate of New Technology Adoption

| Factor | | Percent of Organizations by Employment Size | | |
|---|---|---|---|---|
| | | Medium (200-999) | Large (1000+) | Total |
| ABILITY TO FINANCE | First | 100 | 57 | 60 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance (1) | 3.0 | 1.9 | 1.9 |
| COST OF NEW TECHNOLOGY | First | 0 | 14 | 13 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.4 | 0.4 |
| LACK OF GOVERNMENT ASSISTANCE | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.3 | 0.3 |
| UNION RESISTANCE | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.1 | 0.1 |
| EMPLOYEE ACCEPTANCE | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.1 | 0.1 |
| LACK OF SKILLS AND/OR KNOW-HOW TO IMPLEMENT | First | 0 | 14 | 13 |
| | Second | 0 | 57 | 54 |
| | Third | 100 | 29 | 33 |
| | Weighted Importance | 1.0 | 1.9 | 1.8 |
| UNWILLINGNESS TO CHANGE | First | 0 | 14 | 13 |
| | Second | 100 | 14 | 20 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 2.0 | 0.9 | 0.9 |
| ALL OTHERS | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.4 | 0.4 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

## 4.0 INDUSTRY OUTLOOK TO 1995

This chapter describes the views of respondents in the Provincial Administration on the outlook in Ontario for Gross Domestic Product (GDP), investment plans, aggregate employment and changes in occupational structure to 1995.

### 4.1 Output to 1995

Between 1971 and 1976, Provincial Administration GDP in Ontario increased, in constant dollars, at an average annual rate of 5.0 percent. Under restraint it increased by only 1.5 percent annually from 1976 to 1981 and by 2.8 percent from 1981 to 1982.

Respondents were asked to estimate future increases in Provincial Administration Gross Domestic Product in Ontario in constant dollars. The results are shown in Table 19. The respondents suggest a 2.0 percent rate from 1982 to 1983, and 3.5 percent per annum for the period 1983 to 1995.

These responses may be optimistic. Expert interviews indicated an increase in provincial expenditures at or below inflation. The expert responses suggest, therefore, no real increase in expenditures throughout most of the period under review.

### 4.2 Investment Patterns

Although the questionnaire asked for capital investment in Ontario, there were not sufficient responses to report. The survey results did suggest, however, that the ministries surveyed expect that 60 to 75 percent of their machinery and equipment expenditures over the next ten years will be related to new technology while less than 5 percent of their investment in structures and buildings is related to new technology.

Results of Question 1

## TABLE 19: PROVINCIAL ADMINISTRATION

SIC 931

Provincial Administration
Gross Domestic Product in Ontario

| Organization by Employment Size | Average Annual Compound Rate of Change (in Constant Dollars) (1) | | | | |
|---|---|---|---|---|---|
| | Estimated | | | Expected | |
| | 1982-1983 | 1983-1984 | 1984-1985 | 1985-1990 | 1990-1995 |
| Medium (200-999) | n.a. | n.a. | n.a. | n.a. | n.a. |
| Large (1000+) | 2.0 | 3.5 | 3.5 | 3.5 | 3.5 |
| Total | 2.0 | 3.5 | 3.5 | 3.5 | 3.5 |

(1) Rounded to closest 0.5%
n.a. no answer

### 4.2.1 Justifying Financial Investment in New Technology

Respondents were asked how they evaluate and justify investments in new technology. Six of the eight ministries use the concept of pay-back period while one out of three use return on investment (ROI). The average pay-back period is 3.6 years but variations were noted such as 4 years for computers, 4 to 5 years for telecommunications equipment, 1 to 2 years for some other equipment. Only one respondent offered an ROI hurdle rate - 15 percent. Ministries also use a variety of other bases for evaluating such investments including client requirements and cost-benefit analysis. Productivity was another theme frequently mentioned in interviews.

### 4.2.2 Source of New Capital Spending

This question was essentially irrelevant to the provincial ministries as all funding is internal to the Ontario Government. It is impossible to allocate the financing of capital expenditures as being from current revenues or debt financing. The pattern of responses did indicate that some equipment and machinery such as word processors and micro-computers is funded from Ministry allocations while larger purchases are from sources external to the individual ministry.

## 4.3 Employment to 1995

This section reviews expected trends in employment patterns and the most important factors affecting ministry employment levels.

Results of Question 11a,b,c

## TABLE 20: PROVINCIAL ADMINISTRATION

SIC 931

Most Important Factors Affecting the Organizations' Employment in Ontario

| Factor | | Percent of Organizations by Employment Size: Medium (200-999) | Large (1000+) | Total |
|---|---|---|---|---|
| PROFITABILITY/ FINANCIAL STRENGTH | First | 100 | 0 | 7 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance (1) | 3.0 | 0.0 | 0.2 |
| INTRODUCTION OF NEW TECHNOLOGY | First | 0 | 0 | 0 |
| | Second | 0 | 29 | 27 |
| | Third | 0 | 14 | 13 |
| | Weighted Importance | 0.0 | 0.7 | 0.7 |
| PROGRAM DIVERSIFICATION | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 29 | 27 |
| | Weighted Importance | 0.0 | 0.6 | 0.5 |
| ABILITY TO COMPETE | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.3 | 0.3 |
| INDUSTRY-WIDE GROWTH | First | 0 | 29 | 27 |
| | Second | 0 | 14 | 13 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 1.1 | 1.1 |
| OVERALL ECONOMIC GROWTH | First | 0 | 43 | 40 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 1.3 | 1.2 |
| PUBLIC POLICY/ RESTRAINT | First | 0 | 29 | 27 |
| | Second | 100 | 14 | 20 |
| | Third | 0 | 29 | 27 |
| | Weighted Importance | 2.0 | 1.4 | 1.5 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

### 4.3.1 Factors Affecting Employment

When asked to identify the most important factors affecting the ministry's employment level in Ontario, respondents identified the following, ranked according to their weighted importance (see Table 20).

| | Overall Weighted Importance |
|---|---|
| • Public policy/fiscal restraint | 1.5 |
| • Overall economic growth | 1.2 |
| • Growth in government programs/services | 1.1 |
| • Introduction of new technology | 0.7 |

The ministries consistently identified fiscal restraint and government priorities as the number one factor affecting future employment levels. Next in importance was the overall economic performance of Ontario. That is, the growth of the Ontario Government is perceived to be directly related to the performance of the economy and the flow of revenues to Queen's Park. Expansion of ministry programs and services was the third most commonly cited factor. The introduction of new technology was a distant fourth factor. Managers generally cited that new technology was required to deliver services and programs under continued restraint. Somewhat surprisingly, ministries did not specifically mention government measures to privatize or transfer to local governments provincial services/programs as factors affecting future employment.

### 4.3.2 Employment Outlook

In 1984, there were approximately 84,000 Ontario public servants (classified, unclassified and other Crown employees in the Ontario Public Service and the Ontario

Results of Question 11d

## TABLE 21: PROVINCIAL ADMINISTRATION SIC 931

Organizations' Employment Trends in Ontario

| Organization by Employment Size | Total Employment and Average Annual Compound Rate of Change (1) | | | |
|---|---|---|---|---|
| | Estimated Rate | | Expected Rate | |
| | 1981-1984 | 1984-1985 | 1985-1990 | 1990-1995 |
| Medium (200-999) | 0.0 | 2.0 | 0.0 | 0.0 |
| Large (1000+) | -0.5 | -1.0 | -1.0 | -0.5 |
| Total | -0.5 | -0.5 | -1.0 | -0.5 |

(1) Rounded to closest 0.5%.

Workers' Compensation Board). This figure excludes seasonal employment which averages about 13,000 to 15,000 employees per annum for periods averaging three months in length. For purposes of this report, the 84,000 employment figure is used to indicate the current level of employment in Provincial Administration (SIC 931).

Between 1971 and 1981, using Census data, employment in Provincial Administration grew at an average annual compound rate of 1.9 percent. Between 1981 and 1984, Ontario Public Service Commission data indicates employment declined by approximately 0.5 to 1.0 percent per annum.

The ministry respondents in the survey were asked to indicate their employment levels from 1981 to 1984, for 1985, 1990 and 1995. Based on their responses, Table 21 shows the average annual compound rates of change for these periods.

The survey results for the 1981 to 1984 period reflect the overall data from the Ontario Public Service Commission cited earlier. Ministries anticipate further declines in employment over the next ten years at an average rate of 1.0 percent per annum in the 1985 to 1990 period and 0.5 percent per annum from 1990 to 1995. Expert interviews tended to reinforce this outlook when looking at full-time equivalency. That is, they saw the relative share of the Ontario budget for salaries and benefits as essentially unchanged over the next ten years. They expected total employment to remain unchanged while full-time, regular employment is expected to decline due to increased usage of part-time employees. This trend is discussed next.

### 4.3.3 Trends in Part-Time Work

The ministries were asked to indicate their use of part-time employment for the periods 1981, 1984, 1985 and their expectations for 1990 and 1995.

The survey suggests that part-time employees represent approximately 10 percent of total employment in Provincial Public Administration. Ministries surveyed expect a slight increase to 11 percent over the next ten years.

## 4.4 Changes in Occupational Structure

Table 22 shows expected trends in occupational structure (i.e., percent of total employment by occupation) in Provincial Administration from 1981 to 1995 by major occupational categories and the direction of change for specific selected occupations. Respondents generally expect little change from the current occupational structure. Exhibit 14 shows the direction of change in the major occupational categories from 1971 to 1981 based on Census data. Also shown in the exhibit is the direction of change for these occupational groups, based on the survey.

## EXHIBIT 14

## TRENDS IN OCCUPATIONAL STRUCTURE, 1971 TO 1995

| | Census (Actual) 1971 to 1981 | Based on Survey 1981 to 1985 | 1985 to 1990 | 1990 to 1995 |
|---|---|---|---|---|
| | Direction | | | |
| • Managerial, Administrative and Related | + | - | o | o |
| • Natural Sciences, Engineering and Mathematics | + | + | + | + |
| • Clerical | + | + | - | - |
| • All Others | - | - | o | o |

+ Increase
o Little or no change
- Decrease

Given the small degree of change expected in the occupational structure, only a few clear trends emerge:

- Relatively more executive and senior level (government administrators) and specialized managers are expected and fewer government inspectors.

- Relatively more systems analysts/computer programmers and fewer technicians/technologists.

Results of Question 12

## TABLE 22: PROVINCIAL ADMINISTRATION — SIC 931

Trends in Organizations' Occupational Structure

| Occupations | Percent of Total Employment by Selected Occupational Categories | | | | |
|---|---|---|---|---|---|
| | Estimated | | | Expected | |
| | 1981 | 1984 | 1985 | 1990 | 1995 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 39.6 | 38.7 | 38.4 | 38.4 | 38.3 |
| • Government Administrators | | + | + | + | + |
| • Government Inspectors and Regulators | | - | - | - | - |
| • Financial Officers | | + | - | - | 0 |
| • Personnel and Related | | 0 | 0 | 0 | 0 |
| • All Other Managerial | | + | + | + | + |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 10.3 | 10.3 | 10.8 | 11.1 | 11.3 |
| • Engineers | | + | 0 | + | 0 |
| • Scientists | | - | 0 | 0 | 0 |
| • Technicians and Technologists | | - | - | - | 0 |
| • Draughtsmen | | - | - | - | 0 |
| • Systems Analysts and Computer Programmers | | + | + | + | + |
| • All Other Natural Sciences | | 0 | 0 | 0 | 0 |
| CLERICAL | 34.0 | 35.2 | 34.9 | 34.7 | 34.5 |
| • Clerical Supervisors | | + | + | + | + |
| • Secretaries | | - | 0 | 0 | 0 |
| • Typists/Clerk Typists (includes Word Processing Operators) | | - | - | - | - |
| • Bookkeepers and Accounting Clerks | | - | - | - | - |
| • Statistical Clerks | | 0 | 0 | - | - |
| • EDP Equipment Operators | | 0 | 0 | 0 | 0 |
| • Library File Clerks | | - | - | - | - |
| • General Office Clerks | | 0 | 0 | 0 | 0 |
| • All Other Clerks | | - | 0 | 0 | 0 |
| OTHER OCCUPATIONS | 16.1 | 15.8 | 15.9 | 15.8 | 15.9 |
| TOTAL | 100% | 100% | 100% | 100% | 100% |

+ increase - decrease 0 no change

- Relatively more clerical supervisors and fewer clerk typists, file clerks and accounting clerks.

However, these changes should not be overstated. The shifts anticipated are minor.

Results of Question 6

TABLE 23: PROVINCIAL ADMINISTRATION — SIC 931

Impact of Technology on Selected Occupations in Organizations 1985-1995

| Occupations | Percent of Organizations | | |
|---|---|---|---|
| | Oversupply | Shortage | No Response |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | |
| • Government Administrators | 20 | 80 | 0 |
| • Government Inspectors and Regulators | 27 | 27 | 46 |
| • Financial Officers | 0 | 100 | 0 |
| • Personnel and Related | 13 | 67 | 20 |
| • All Other Managerial | 33 | 54 | 13 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | |
| • Engineers | 33 | 0 | 67 |
| • Scientists | 13 | 0 | 87 |
| • Technicians and Technologists | 13 | 7 | 80 |
| • Draughtsmen | 20 | 0 | 80 |
| • Systems Analysts and Computer Programmers | 0 | 87 | 13 |
| CLERICAL | | | |
| • Clerical Supervisors | 47 | 27 | 27 |
| • Secretaries | 60 | 13 | 27 |
| • Typists/Clerk Typists (includes Word Processing Operators) | 60 | 13 | 27 |
| • Bookkeepers and Accounting Clerks | 47 | 13 | 40 |
| • Statistical Clerks | 40 | 20 | 40 |
| • EDP Equipment Operators | 54 | 33 | 13 |
| • Library File Clerks | 60 | 13 | 27 |
| • General Office Clerks | 33 | 0 | 67 |
| • All Other Clerks | 31 | 0 | 69 |
| OTHER OCCUPATIONS | 0 | 18 | 82 |

## 5.0 EMPLOYMENT EFFECTS OF NEW TECHNOLOGY

This chapter reviews the survey results from the Ontario ministries on the employment effects of new technology in terms of skills match and requirements, and the impact on skill levels and job content. Also discussed are training costs particularly as they relate to new technology.

### 5.1 Effects on Occupations

Table 23 summarizes the provincial ministries' expectations of the technology impact on occupational requirements. Only a few of the selected occupations are expected to be in short supply within the individual organizations. The following is a list of occupations in which 35 percent or more of the ministries expect a shortage of skills due to the adoption of new technology:

- Government administrators (80%),
- Financial officers (100%),
- Personnel officers (67%),
- All Other Managers (54%), and
- Systems analysts/computer programmers (87%).

The occupations in which 35 percent or more of the ministries expect an oversupply of skills within their organizations due to the adoption of new technology are:

- Clerical supervisors (47%),
- Secretaries (60%),
- Typists, including word processing operators (60%),
- Bookkeepers/accounting clerks (47%),
- Statistical clerks (40%),
- EDP equipment operators (54%), and
- Library/file clerks (60%).

Results of Question 7

## TABLE 24: PROVINCIAL ADMINISTRATION — SIC 931

Steps Organizations Will Likely Take to Deal With An OVERSUPPLY of Skills
1985-1995

| Occupations | Most Commonly Cited | Second Most Common | Third Most Common |
|---|---|---|---|
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | |
| • Government Administrators | Attrition | Retrain | (1) |
| • Government Inspectors and Regulators | Retrain | Attrition | Relocate |
| • Personnel and Related | Retrain | Relocate | (1) |
| • All Other Managerial | Retrain | Lateral Transfer | Attrition |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | |
| • Engineers | Attrition | Downgrade | Early Retirement |
| • Scientists | Attrition | Retrain | (1) |
| • Technicians and Technologists | Attrition | Early Retirement | (1) |
| • Draughtsmen | Retrain | Attrition | Downgrade |
| CLERICAL | | | |
| • Clerical Supervisors | Retrain | Attrition | Downgrade |
| • Secretaries | Retrain | Attrition | Relocate |
| • Typists/Clerk Typists (includes (Word Processing Operators) | Retrain | Attrition | Job Share |
| • Bookkeepers and Accounting Clerks | Attrition | Retrain | Upgrade |
| • Statistical Clerks | Attrition | Retrain | Upgrade |
| • EDP Equipment Operators | Attrition | Retrain | Downgrade |
| • Library File Clerks | Retrain | Attrition | Layoff |
| • General Office Clerks | Retrain | Layoff | Upgrade |
| • All Other Clerks | Layoff | Shorter Hours | Attrition |

(1) Only two steps mentioned.

## 5.2 Likely Steps to Deal With Skills Oversupply

In dealing with a potential oversupply of skills in their organizations, the most commonly cited steps by occupation are shown in Table 24 and summarized below in terms of frequency cited.

| | Frequency of Appearance on Table 24 | | |
|---|---|---|---|
| Response | Most Common | Second | Third |
| Attrition | 7 | 6 | 2 |
| Retraining | 9 | 5 | |
| Lateral transfer | | 1 | |
| Layoffs | 1 | 1 | |
| Upgrade | | | 3 |
| Downgrade | | 1 | 3 |
| Shorten hours | | 1 | |
| Relocate | | 1 | 2 |
| Early Retirement | | 1 | 1 |
| Job Sharing | | | 1 |

The table shows several patterns:

- A wider variety of measures are indicated than by Federal respondents. Based on expert interviews, this may be influenced by the fact that the Ontario managers have had to live with restraint since 1975 and therefore feel a need to use more innovative approaches.

- Retraining is the most commonly cited step followed by attrition.

- Layoffs are cited infrequently.

Results of Question 8

## TABLE 25: PROVINCIAL ADMINISTRATION SIC 931

Steps Organizations Will Likely Take to Deal With a SHORTAGE of Skills 1985-1995

| Occupations | Most Commonly Cited | Second Most Common | Third Most Common |
|---|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE AND RELATED** | | | |
| • Government Administrators | Retrain | Recruit | Relocate |
| • Government Inspectors and Regulators | Retrain | Recruit | (1) |
| • Financial Officers | Retrain | Recruit | Upgrade |
| • Personnel and Related | Retrain | Recruit | Other |
| • All Other Managerial | Recruit | Retrain | (1) |
| **NATURAL SCIENCES, ENGINEERING AND MATHEMATICS** | | | |
| • Technicians and Technologists | Retrain | Recruit | (1) |
| • Systems Analysts and Computer Programmers | Retrain | Recruit | Upgrade |
| **CLERICAL** | | | |
| • Clerical Supervisors | Retrain | Recruit | Upgrade |
| • Secretaries | Retrain | Upgrade | (1) |
| • Typists/Clerk Typists (includes Word Processing Operators) | Retrain | Recruit | Contract Out |
| • Bookkeepers and Accounting Clerks | Recruit | Retrain | (1) |
| • Statistical Clerks | Recruit | Retrain | Upgrade |
| • EDP Equipment Operators | Recruit | Retrain | Contract Out |
| • General Office Clerks | Retrain | Recruit | (1) |
| **OTHER OCCUPATIONS** | Upgrade | Recruit | (1) |

(1) Only two steps mentioned.

## 5.3 Likely Steps to Cope with Skills Shortages

In coping with anticipated skill shortages, the most commonly cited responses by ministries, for specific occupations, are shown in Table 25 and further summarized below in terms of frequency cited.

| | Frequency of Appearance in Table 25 | | |
|---|---|---|---|
| Response | Most Common | Second | Third |
| Recruiting | 4 | 10 | |
| Upgrade | 1 | 1 | 4 |
| Retraining | 10 | 4 | |
| Contract out | | | 2 |
| Relocate | | | 1 |

Retraining is viewed by far as the most important measure to acquire needed skills, followed by recruitment. Upgrading is seen as the third most important measure which would tend to complement retraining.

## 5.4 Technology Impact on Skill Levels and Job Content

Ministry respondents were asked to indicate the impact of new technologies on selected occupations in terms of:

- skills required,
- time to achieve proficiency, and
- knowledge of organizations operations.

by indicating an increase (+), a decrease (-) or remain about the same (o). The survey results are shown in Table 26.

Results of Question 9

## TABLE 26: PROVINCIAL ADMINISTRATION

SIC 931

Impact of Technology on Skill Levels and Job Content

| Occupations | Percent of Organizations (1) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Skills Required | | | Time to Achieve Proficiency | | | Knowledge of Organization's Operations | | |
| | + | - | 0 | + | - | 0 | + | - | 0 |
| **MANAGERIAL, ADMINISTRATIVE AND RELATED** | | | | | | | | | |
| • Government Administrators | 100 | 0 | 0 | 87 | 0 | 13 | 73 | 0 | 27 |
| • Government Inspectors and Regulators | 100 | 0 | 0 | 66 | 17 | 17 | 33 | 0 | 67 |
| • Financial Officers | 100 | 0 | 0 | 74 | 13 | 13 | 60 | 0 | 40 |
| • Personnel and Related | 80 | 13 | 7 | 67 | 13 | 20 | 40 | 0 | 60 |
| • All Other Managerial | 100 | 0 | 0 | 87 | 0 | 13 | 67 | 0 | 33 |
| **NATURAL SCIENCES, ENGINEERING AND MATHEMATICS** | | | | | | | | | |
| • Engineers | 100 | 0 | 0 | 100 | 0 | 0 | 60 | 40 | 0 |
| • Technicians and Technologists | 100 | 0 | 0 | 71 | 0 | 29 | 71 | 29 | 0 |
| • Draughtsmen | 100 | 0 | 0 | 33 | 33 | 34 | 0 | 0 | 100 |
| • Systems Analysts and Computer Programmers | 77 | 0 | 23 | 46 | 15 | 39 | 85 | 0 | 15 |
| **CLERICAL** | | | | | | | | | |
| • Clerical Supervisors | 85 | 15 | 0 | 70 | 15 | 15 | 62 | 15 | 23 |
| • Secretaries | 100 | 0 | 0 | 60 | 0 | 40 | 40 | 0 | 60 |
| • Typists/Clerk Typists (includes Word Processing Operators) | 74 | 13 | 13 | 20 | 27 | 53 | 31 | 15 | 54 |
| • Bookkeepers and Accounting Clerks | 54 | 31 | 15 | 39 | 15 | 46 | 15 | 15 | 70 |
| • Statistical Clerks | 46 | 18 | 36 | 46 | 18 | 36 | 0 | 18 | 82 |
| • EDP Equipment Operators | 31 | 31 | 38 | 15 | 31 | 54 | 8 | 15 | 77 |
| • Library File Clerks | 54 | 31 | 15 | 38 | 31 | 31 | 0 | 15 | 85 |
| • General Office Clerks | 46 | 15 | 39 | 31 | 15 | 54 | 0 | 15 | 85 |
| **OTHER OCCUPATIONS** | 36 | 18 | 46 | 36 | 18 | 46 | 0 | 18 | 82 |

+ increase - decrease 0 remain the same

(1) Non-responses excluded.

Exhibit 15, below, provides a further summary of the pattern of responses in terms of the consensus view of respondents on the impact of new technology on skills, time to achieve proficiency and knowledge of the organization.

**EXHIBIT 15**

**GENERAL CONSENSUS ON IMPACT OF NEW TECHNOLOGY**

| | | | |
|---|---|---|---|
| • Managerial, Administrative and Related | + | + | + |
| • Natural Sciences, Engineering and Mathematics | + | + | + |
| • Clerical | + | o | o |
| • All Others | o | o | o |

+ Increase
o Remain the same

Clearly, provincial managers perceive that technology will increase the need for more skills. They see managerial, professional and technical occupations, clerical supervisors and secretaries, needing more time to become proficient and requiring more knowledgeable of their organizations.

## 5.5 Training Costs and New Technology

Ministry managers estimate that they currently spend, on average, the equivalent 1.5 to 2.0 percent of total labour costs on training. They do not anticipate any relative increase in the expenditure over the next decade. However, whereas currently 35 to 40 percent of the training costs are related to new technology, by 1990 and 1995 it will be 48 to 50 percent.

TABLE 27

INDUSTRIAL RELATIONS: PROVINCIAL ADMINISTRATION

| UNION | NUMBER OF EMPLOYEES | MAJOR EMPLOYER* | LOCATION | TECHNICAL CHANGE CLAUSE IN AGREEMENT |
|---|---|---|---|---|
| ONTARIO PUBLIC SERVICE EMPLOYEES | 9,600 | ONTARIO GOVERNMENT Clerical Services | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 7,100 | Office Services | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 5,953 | Maintenance Services | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 5,662 | Administrative Service | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 5,714 | Institutional Care | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 5,354 | Technical Services | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee, Transfer Arrangements and Advance Notice |
| | 4,314 | Scientific and Professional Services | Province-wide | Advance Notice, Consultation, Training, Automation Fund and Transfer Arrangements |
| | 3,909 | General Operational Services | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 2,945 | Correctional Services | Province-wide | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |
| | 228 | NIAGARA PARKS COMMISSION | Niagara Falls | N/A |
| ONTARIO PROVINCIAL POLICE | 4,165 | ONTARIO PROVINCIAL POLICE FORCE | Province-wide | N/A |
| CANADIAN PUBLIC EMPLOYEES (CUPE) | 2,100 | WORKERS COMPENSATION BOARD | Toronto | Advance Notice, Consultation, Training, Joint Automation Committee and Transfer Arrangements |

* Employer with a union agreement covering 18 employees or more. The union agreements above represent 99.9 percent of unionized employees.

N/A Information not available on Ontario Ministry of Labour data base.

SOURCE: Collective Bargaining Agreement Systems, Ontario Ministry of Labour.

## 6.0 LABOUR RELATIONS ENVIRONMENT

This chapter discusses briefly the historical industrial relations environment in the Provincial Government Public Service and reviews the survey reports of ministries and expert interviews with the Ontario Public Service Employees Union (OPSEU) regarding the labour relations environment, particularly as it relates to new technology.

### 6.1 Industrial Relations Environment: Historical

The provincial administration sector in Ontario has 57,082 unionized employees, amounting to approximately 68 percent of total employees in 1983 (see Table 27). The Ontario Public Service Employees Union represents 89 percent of all unionized employees and the main technology clauses contained in their agreements include the following:

- Provisions requiring the employer to inform the employees or the union of impending introduction of changes in machinery, equipment or processes;

- Consultation or negotiation of possible effects of planned technological change or automation;

- Employees affected by technological change are given the opportunity to qualify for available jobs, whether in the same bargaining unit or elsewhere;

- Agreements providing for the setting up of a joint union-management committee to study and discover problems created by technological change; and

- Provisions dealing with the transfer of employees displaced by technological change.

## 6.2 Trends in Unionization

The survey results indicate that approximately 80 percent of the employees in provincial ministries surveyed are represented by a union. The ministries surveyed foresee no change in the portion of their work force that is unionized over the next ten years.

## 6.3 Technology Change Clauses

Of the ministries surveyed, approximately 90 percent report having union contracts with a technology change clause (all of the unionized employees in the ministries surveyed have the Ontario Public Services Employees Union (OPSEU) as their collective bargaining agent). As discussed in Section 12.1, OPSEU contracts cover:

- Advance notice,
- Consultation,
- Training,
- Joint committees, and
- Transfer arrangements.

The ministry responses suggest that some managers are not familiar with some of the aspects of the clauses.

Ministry mangers answered affirmatively to the question on whether the technology clauses are being effectively administered. There are no union responses for the ministries surveyed as OPSEU chose not to participate in this aspect of the study. OPSEU senior officers did, however, participate at two stages of the study as expert interviewees. The OPSEU officials indicated considerable dissatisfaction with the administration of technology change clauses including:

- lack of open communication,
- inadequate advance notice,
- uneven application of transfer and retraining clauses, and
- insensitivity to health and safety concerns.

From the perspective of these senior union officials, the current administration of the technology change clauses is considerably different from that of the managers surveyed.

## 6.4 Management's Perception of their Union's Position on New Technology

Management respondents were asked an open-ended question on what has been the union's position on the adoption of new technologies. The pattern of responses can be summarized as follows:

- Approximately 25 percent had no opinion.

- Of the remaining respondents, less than 20 percent acknowledged in their responses that the union accepts the need for technology adoption.

- The union's chief concerns, as perceived by the managers, in order of frequency mentioned, were:

  - job security/no layoffs,
  - health, safety and ergonomics,
  - retraining
  - de-skilling, and
  - impact on technology decisions.

OPSEU senior officials' perceptions of their union's concerns reflected a similar hierarchy of concerns. In addition to the concerns mentioned by management, OPSEU officials cited concerns over:

- electronic surveillance,
- impact of technology and government restraint on affirmative action, and
- reclassification of jobs.

Union officials cited surveys of their membership indicating a shift in attitudes in recent years away from wages and salaries to issues related to new technology. The current issues of most concern to the membership are, in order of importance:

1. Job security,
2. New technology and dislocations (e.g., relocation, transfers),
3. - Health and safety,
   - Quality of working life,
   - Affirmative action, and
4. Wages.

## 6.5 Nature of Worker Involvement in the Process of Technological Change

Provincial ministries were asked to indicate whether they had a formal mechanism for employee participation in:

- setting production targets at various levels in the organization,
- improving productivity/quality,
- adopting new technology.

The survey results suggests that:

- Few ministries report having formal mechanisms for employee participation in setting production targets;

- Approximately one-third report having formal mechanisms to improve productivity and/or quality and to deal with the adoption of new technology.

Unfortunately, there was no basis upon which to judge how union members in the ministries perceived the incidence of such mechanisms.

## 6.6 Views on Involving Workers in Decisions on Adopting New Technology

Ministry respondents were asked an open-ended question as to what extent and how should management involve employees in decisions on adopting new technology. The pattern of responses may be summarized as follows:

- Approximately, 60 percent of the ministries favoured a high degree of consultation at all stages of the process including:

  - communicate advantages and necessity of technology change,
  - early input,
  - give advanced notice, and
  - consult workers on managing implementation.

- Approximately 30 percent favoured limited involvement such as involvement of only those directly affected during implementation.

The responses represented a fairly wide range of approaches, and a few respondents considered no involvement as appropriate.

OPSEU officials expressed the need to change the legislation affecting collective bargaining around technology change. They expressed the views that:

- the introduction of new technology should be an informed process (e.g., long range notification),
- technology introduction should be a joint process between management and labour with a commitment to education and retraining, and
- in some cases, the introduction of new technology should not proceed.

As indicated in Section 9.1, the Ontario Government has had an Interministerial Technology Strategy Steering Committee. One of its project teams dealt with human resources and technology. Expert interviews suggest that this project is advocating a people-oriented, not a technology-oriented, approach to the introduction of new technology, including such principles as:

- an emphasis on the productive capacity of staff (i.e., new technologies are tools),
- plans for technology change must include:
  - full consideration of human resource impacts and requirements,
  - provision for advance communications to employees,
  - guidelines for training, job design, redeployment of staff and performance appraisal.

- commitments to:
  - union consultation at all levels of the Ontario public service,
  - minimize the need for layoffs,
  - enhancement of work through job, design and redeployment,
  - incentives for effective participation in introducing technology,
  - developing strategies which ensure women benefit from technology change,
  - provide for appropriate ergonomics.

These matters are currently under consideration by senior managers from across the Ontario Government.

Results of Question 18

## TABLE 28: PROVINCIAL ADMINISTRATION

SIC 931

Planning for Technological Change

| Organizations by Employment Size | Strategic Plan | Human Resource Plan | | Capital Investment Plan | | Perceived Integration Between Capital and Human Plans (1) |
|---|---|---|---|---|---|---|
| | Percent of Organizations With Plan | Percent of Organizations With Plan | Length of Planning Horizon | Percent of Organizations With Plan | Length of Planning Horizon | |
| Medium (500-999) | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| Large (1000+) | 71 | 57 | 4 years | 57 | 4 years | 2.8 |
| Total | 71 | 57 | 4 years | 57 | 4 years | 2.8 |

(1) Using a scale of 1 to 5; 1 represents "Not at all integrated" and 5 "Highly integrated".
n.a. no answer

## 7.0 PLANNING FOR TECHNOLOGICAL CHANGE

The following chapter reports results of the survey of Ontario ministries related to planning for technological change. Table 28 summarizes the results.

Of the ministries surveyed, 70 percent of those who answered the question report having a long-term strategic plan.

Approximately 55 percent of the ministries responding report having a human resource plan. The average length of the planning horizon for these organizations is four years. A similar percent (55%) of the responding ministries report having a capital investment plan dealing with the adoption of new technology. The average length of the planning horizon for these plans is also four years.

When asked about the degree of integration between their human resource and capital investment plans, the ministries with such plans rated them as fairly integrated - at 2.8, based on a scale of 1 - "not at all integrated" to 5 - "highly integrated".

## SECTION III - LOCAL ADMINISTRATION

### PART II - HISTORICAL TRENDS 1971-1984

### 2.0 INTRODUCTION

This section of the report provides a brief historical analysis of Local Administration in Ontario for the periods 1971 to 1981 and 1982 to 1984.

### 2.1 The Structure of the Organization

There are 39 upper tier governments (regional governments, counties) and 798 lower tier municipalities (cities, towns, villages, townships) in Ontario. In 1983, the 39 upper tier governments employed 48,173 people and the lower tier governments, 59,301 for a total of 107,474 local government employees.[1]

Legally, all local governments come under the jurisdiction of the Province which has the authority to create them and to define their powers and functions. Indeed, municipalities require specific authority from provincial statutes for everything they do. School boards are separately incorporated and are excluded from the discussion that follows.

"There are three categories of municipal structure in Ontario: restructured two tier systems, the county system and single tier municipalities.

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1. Ontario Ministry of Municipal Affairs and Housing.

Two-thirds of Ontario's population lives in areas with restructured two tier systems. The first of these systems, Metro Toronto, was set up in 1954 while the others were formed during the period 1969-1975. In each restructured system there is one upper tier municipality supported by a number of lower tier or area municipalities. The division of responsibilities between upper tier and lower tier municipalities is defined by statute and varies from one system to another. In general, the upper tier municipalities provide health and social services, police protection, transit, major roads, sewers, water, garbage disposal and regional planning. Services such as fire protection, local roads, garbage collection, recreational services and neighbourhood planning are normally provided by lower tier municipalities. The thirteen restructured two tier systems have 93 lower tier municipalities between them.

The county system covers all of southern Ontario except those parts now restructured. The county municipalities usually have responsibility only for county roads, and health and social services; all other services are provided by the lower tier municipalities. Cities, and a few large towns (separated towns) which are within county boundaries are not part of the county system. These municipalities, which range in size from the City of London (population 250,000) to the Town of St. Mary's (population 5,000) operate as single tier municipalities.

Most of the northern part of the Province is sparsely inhabited and is without any form of municipal organization. Areas with sufficient population to make municipal organization feasible are organized into single tier municipalities, except two areas which have restructured two tier systems."[1]

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1. Ministry of Treasury, Economics and Intergovernmental Affairs, Local Government Finance in Ontario, 1975 and 1976, pp. 143 and 144.

Municipalities raise revenue through the property tax. All property taxes are collected by lower tier municipalities. Upper tier municipalities can requisition the lower tier for their needs. The amount of property tax that can be levied in any one year cannot exceed the expenditure requirements for that year. In 1982, Ontario municipalities raised $2.8 billion or 34.6 percent of total revenue from property taxes (see Table D.22 in Appendix D). Their other sources of revenue were Ontario grants ($2.5 billion) and non-tax revenues ($2.3 billion) which include user fees (for transit, water, homes for the aged, etc.) and payments in lieu of taxes. Since 1976, property taxes and Ontario grants have declined in importance, while user fees and long term borrowing have contributed a rising share of revenues.[1]

Table D.22 also shows the composition of expenditure in 1976 and 1982. Half the municipal budget (48.1 percent) goes to pay wages and salaries, so manpower is a very important aspect of municipal costs. About 26.5 percent goes to purchase materials and supplies. The remainder goes into debt charges, transfers to other agencies and transfers to reserves.

Table D.23 shows the relative importance of municipal services in 1976 and 1982.

- "General Government (11.1 percent in 1982). This includes expenses for municipal councils, general municipal administration, tax collection, elections, audit costs, and financial and other costs which cannot be allocated to other areas.

1. Prior to 1976, municipal finance statistics were published in a different format which is not compatible with the current presentation.

- Protection (17.9 percent). Police protection is provided by municipalities in urban areas, but rural areas are policed by the Ontario Provincial Police and prison costs are all paid by the Province. Fire protection throughout the province is a municipal responsibility.

- Transportation (24.0 percent). All public roads except Provincial highways are constructed and maintained by municipalities. Road expenditures include traffic control, parking and street lighting. Urban transit systems are municipal responsibilities and a few municipalities maintain small airports and docking facilities.

- Environment (14.4 percent). Sewer and water services, including storm sewers where these are separate from sanitary sewers, are primarily the responsibility of municipalities. In certain cases, where the most efficient way of providing services has been through major facilities beyond the technical or financial capacity of the municipalities involved, the Province constructs and operates the facilities on a charge-back basis. Solid waste collection and disposal is a municipal responsibility, though in rural areas and apartment buildings in certain urban areas, property owners may have to provide their own service. Some municipalities operate derelict motor vehicle and other pollution control programs.

- Health and Social Services (18.9 percent). Municipalities and their local boards are responsible for day care and other services for children, homes for the aged, public health, ambulance and cemetery services. In addition, they are required to provide welfare assistance to needy residents who do not qualify for assistance under Federal and Provincial welfare programs. Public hospitals are locally administered but are financed and regulated by the

Province. Municipalities contribute a portion of the capital costs of new hospitals. Some municipalities in isolated areas contribute towards medical centres in order to encourage medical professionals to locate in their communities.

- Culture and Recreation (11.1 percent). Municipalities, local boards and, in some instances, school boards provide most parks and recreation services. They also provide cultural services such as museums, auditoriums, zoos and art galleries.

- Planning and Development (2.6 percent). Municipalities are responsible for land use planning within overall Provincial guidelines. Public housing is generally a Provincial responsibility, but municipalities contribute towards certain housing programs. In addition, some urban municipalities have established non-profit housing agencies. Many municipalities have established industrial parks and other programs to foster commercial and industrial development. Rural municipalities are involved in agricultural development through drainage and other programs."[1]

Over the period since 1982, environmental services (mainly sewer and water) have increased in importance while protection and health and social services have declined in importance. However, the share of welfare assistance has probably increased since 1982 because of the significant increase in unemployment in Ontario.

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1. Local Government Finance in Ontario, 1975 and 1976 op. cit., pp. 145 and 146.

## 2.2 The Market Environment

The key determinants of the growth in Local Government expenditures are:

- The growth in the population requiring services.

- The trend toward urbanization. Movement into the major cities creates a need for housing, water and sewage services without a corresponding reduction in these costs in rural areas.

- The changing age structure of the population. An increase in the number of elderly people of limited means, for example, will increase the need for homes for the aged.

- The performance of the economy. Municipalities are the last resort for unemployed citizens whose unemployment insurance has expired and who have no other source of income. Their expenditures on welfare payments are funded, at least in part, by grants from the federal and provincial governments, but the actual payments to individuals are recorded at the local level. Any significant increase in unemployment usually leads to extra demands on the municipal budget.

Local governments in Ontario do not have a high degree of flexibility with respect to revenues. They can increase property taxes. Such taxes are not popular, even though the province has introduced a system of tax credits to alleviate tax burdens on low-income households. Table D.24 shows that net municipal property taxes were 2.2 percent of household income in 1982, up from the mid 1970's but down from 2.7 percent in 1970.

These figures include school taxes, and school taxes have accounted for an increasing share of property taxes since 1975. Municipal property tax burdens have therefore diminished since 1970. However, the scope for raising property taxes is now constrained by the slow growth in personal incomes.

The other source of revenue that is controllable is user fees such as those for transit and water. These have risen faster than all the other sources of revenue since 1976 (see Table D.22). However, some municipalities have found that use of public services such as public transit falls off when fees are raised, so the net impact on revenues is not as high as expected.

The province is the final arbiter of the level of Ontario grants and also of the amount borrowed by local governments. All municipal borrowing is done by the upper tier municipality. The Ontario Management Board decides whether the debt is "expedient" and whether it can be repaid. Borrowing is permitted only for capital purposes and the debt must be repaid over the useful life of the asset being acquired. Net debt outstanding in 1982 amounted to $3.2 billion up from $1.5 billion in 1974.[1]

In summary, the economic determinants of the demand for municipal services will favour increases in spending in the forecast period, even though the pressures from population growth and urbanization will diminish in relation to the 1970's (see Table D.25). The age structure of the population and high levels of unemployment will create strong demand for health and social services. At the same time, however, the financial environment will force municipalities to seek ways to reduce costs and increase efficiency.

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1. The 1974 debt is tax supported only. Another $433 million in non tax supported debt was also outstanding. Local Government Finance, 1975 and 1976, op. cit. p. 59.

Revenue growth has slowed due to:

- The slower rate of increase in property values caused by interest rates, lower inflation and slower economic growth has made it more difficult to raise property assessments;
- Fiscal restraint by the province which provides 31.7 percent of revenue; and
- Citizens will not be receptive to increases in property taxes because of the slow rise in household income caused by high unemployment and weak increases in wage rates.

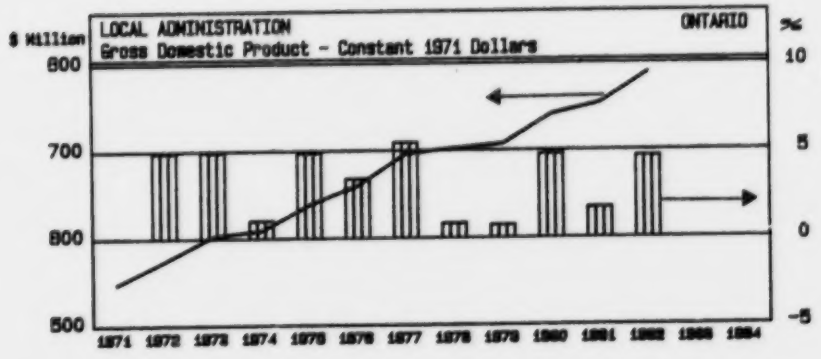
## 2.3 Industry Trends

Tables D.26 to D.29 present key indicators for the years 1971 to 1984.

### 2.3.1 Aggregate Output

Gross domestic product for Local Administration in Ontario increased from $547 million in 1971 to $2.3 billion in 1981, an average annual rate of increase of 15.4 percent. Output increased by 16.9 percent in 1982 to reach $2.7 billion.

EXHIBIT 16



In constant dollar terms, output increased from $547 million in 1971 to $753 million in 1981, an average annual rate of increase of 3.2 percent. Output then increased by 4.7 percent in 1982 to reach $788 million. The rate of increase in output was much stronger from 1971 to 1977 than it was from 1978 to 1982, but output jumped in 1980 and 1982. These were both years of slow economic growth.

### 2.3.2 Competitive Position

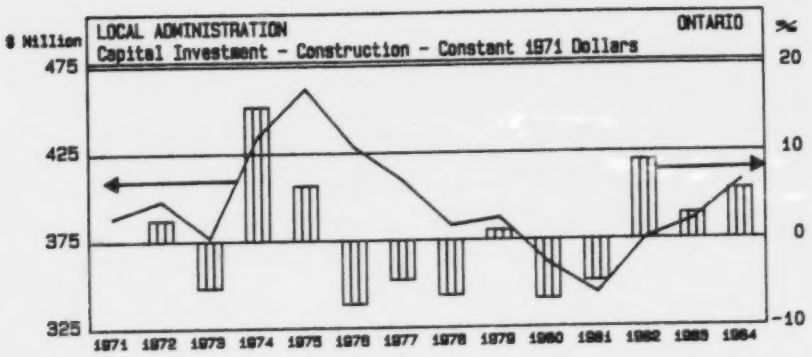
No information is available on productivity and local governments do not compete with each other.

### 2.3.3 Capital Investment

Total investment by local governments in Ontario increased from $409 million in 1971 to $982 billion in 1981, an average annual increase of 9.2 percent (see Tables D.26 and D.27). Investment then increased at an average rate of 9.8 percent from 1981 to 1984, reaching a planned level of $1.3 billion in 1984. Construction activity accounted for over 90 percent of total investment throughout the period shown in the tables.

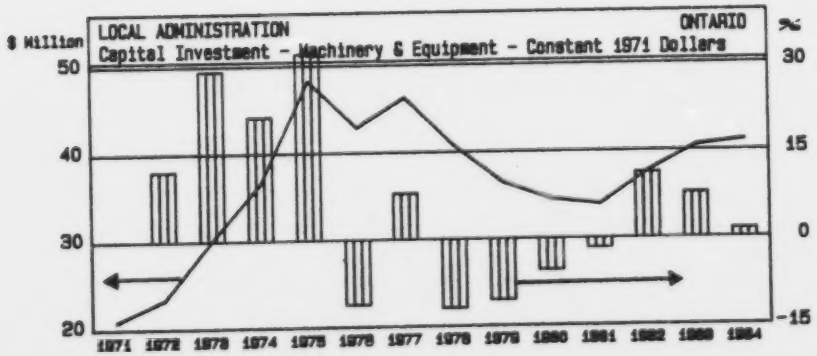
Constant dollar investment outlays by local governments in Ontario declined from $409 million in 1981 to $378 million in 1981, an average rate of decline of 0.8 percent. (See Tables D.28 and D.29). Investment then increased at an average annual rate of 5.9 percent per year from 1981 to 1984 to reach a planned level of $449 million in 1984. However, 1984 investment was still 12 percent below the peak level of activity of $510 million set in 1975.

## EXHIBIT 17




Construction accounted for over 90 percent of investment outlays throughout the period 1971 to 1984. It rose from $388 million in 1971 to a peak of $462 million in 1975 and then declined at an average annual rate of 4.8 percent from 1975 to 1981 when it reached $344 million. After 1981, construction activity rose at a rate of 5.8 percent per year to reach a planned level of $408 million in 1984. The 1984 level was 11.7 percent below the 1975 peak.

## EXHIBIT 18



Constant dollar expenditure on machinery and equipment rose from $21 million in 1971 to a peak of $48 million in 1975 and then declined at an average annual rate of 5.7 percent to $34 million in 1981. Investment in machinery and equipment rose each year from 1982 on and levelled off at $41 million in 1984. The average rate of change from 1981 to 1984 was 6.7 percent.

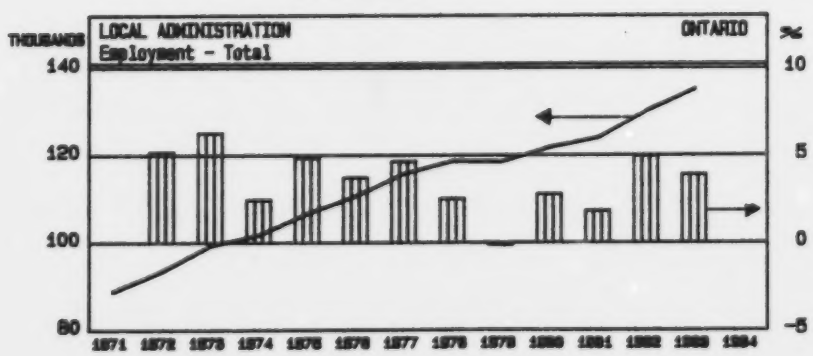
### 2.3.4 Employment

The discussion of employment includes an analysis of aggregate trends and occupational changes.

- Aggregate Trends

In this report two sources of employment data are used in order to provide the level of analysis required. Total employment trends are taken from Statistics Canada, Local Government Employment, Cat. No. 72-009. This data series is used as it shows the year to year trend in total employment. In order to analyze the employment trends by occupation, the Census of Canada has been used. However, this data is only available for the census years 1971 and 1981. These two series differ because of differences in coverage and methodology and this should be noted.

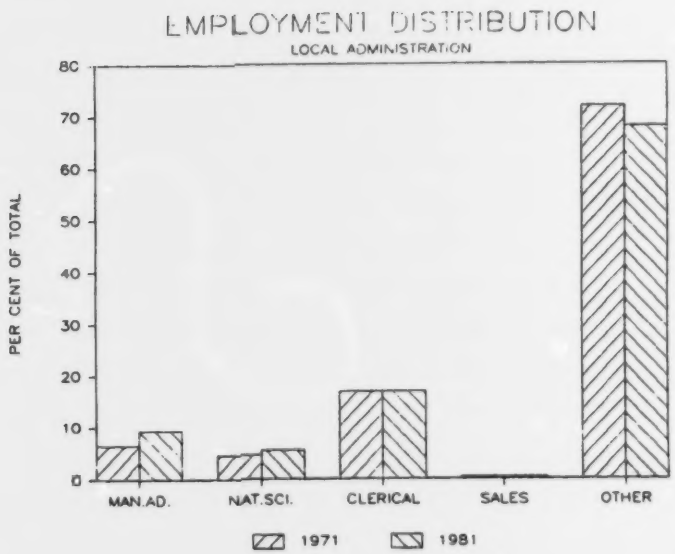
EXHIBIT 19



Total employment in Local Administration in Ontario increased from 88,733 in 1971 to 123,827 in 1981, an average annual rate of increase of 3.4 percent (See Tables D.26 and D.27). The rate of increase was stronger from 1971 to 1977. From 1978 to 1981, growth slowed and employment actually declined by 0.1 percent in 1979. However, the rate of increase accelerated from 1981 to 1983, averaging 4.4 percent per year. Employment reached 135,023 by 1983.

- Occupational Changes

**EXHIBIT 20**




Census data for Ontario indicated total employment in Local Administration of 80,400 in 1981.

The large Other category (see Exhibit 20) represents a broad mixture of occupations: service occupations (e.g., policemen and firefighters) accounted for more than half of this category in 1981, and various other occupations such as construction and nursery workers are also included.

Overall employment increased at an average rate of 3.3 percent from 1971 to 1981 (see Table D.30). The fastest rate of increase occurred in Managerial and Administrative occupations (7.1 percent) and in Natural Sciences and Engineering (5.2 percent). Clerical and Related jobs increased at 3.3 percent per year, the same as the overall average.

Data at the more detailed occupational level show that within the Managerial and Administrative category, jobs for government administrators increased by 6.6 percent and those for inspectors and regulatory officers by 2.7 percent.

Within the Clerical category, secretarial jobs increased by 4.3 percent per year, faster than the average for the group, while clerical jobs for general office clerks and typists grew much more slowly. The number of other clerical and related workers declined by 0.3 percent per year.

Female representation in Local Administration increased from 19.0 percent in 1971 to 28.0 percent in 1981, opening up 11,430 new jobs for women (see Table D.31). Over one-third of these new jobs occurred in Clerical and Related jobs where female representation rose from 66.8 percent in 1971 to

77.9 percent in 1981. This increase in representation was most noticeable in jobs for bookkeepers and accounting clerks and for general office clerks.

The biggest relative change in female representation occurred in Sales, which employed only 180 women in 1981. Their representation rose from 35.9 percent to 70.6 percent.

Female representation in Managerial and Administrative jobs rose from 13.5 percent in 1971 to 24.0 percent in 1981. This included a significant increase in jobs for female government administrators.

## PART III - FUTURE TRENDS: THE SURVEY RESULTS

Part III of this study presents results which discuss organizations' survey opinions as to future trends in technology adoption and employment impacts.

### 3.0 ADOPTION OF NEW TECHNOLOGY

This chapter reviews expected trends in the adoption of new technologies in Local Public Administration and the factors driving the need to adopt and affecting the rate of new technology adoption.

### 3.1 New Technologies and Rates of Adoption

Municipal governments tend to be followers in the adoption of new technology. They tend to look to other municipalities and the provincial government for leadership. Once a technology has been shown to be successful and fully proven, then other municipalities will follow.

The Ontario Government, in particular the Ministry of Municipal Affairs and Housing, has provided assistance to municipalities in terms of publications and funding of pilot projects to encourage local governments to adopt new technology. As the cost of technologies have fallen in recent years and the complexity of running municipal corporations has increased, the municipalities have looked to new technologies to increase productivity and to maintain or enhance services.

Several factors contribute to Local Government generally being a technology follower.

- Municipalities range significantly in their size and degree of sophistication.

- Municipal corporations run a wide range of businesses from public works to parks and recreation, from police, fire and ambulance services to community and social services.

- Municipal corporations are run by municipal councils who reflect the many types and sizes of communities in Ontario. Municipal councilors are highly and directly accountable to their local communities. They are, therefore, conservative in trying new solutions, feeling a strong responsibility not to take risks with public monies.

Nonetheless, in municipal governments, microprocessors are becoming as numerous as electric motors and video display screens as commonplace as typewriters and telephones. The declining costs of proven technologies, the need for higher productivity and a more sophisticated and demanding public are working together to encourage new technology adoption among Local Government. For example, surveys of the Ministry of Municipal Affairs and Housing show that the number of computer installations in Ontario municipalities has grown from 11 in 1968, to 75 in 1977, to 140 in 1981 and are estimated at near 300 in 1985.

Table 29 summarizes the survey results of the Ontario municipalities showing the percentage of municipalities who have adopted representative new technologies already and their expectations for doing so in the periods 1985 to 1990 and 1990 to 1995.

In general, the pattern of responses suggest that the larger municipalities (1,000 or more employees) are more advanced in their adoption of new technologies than medium sized municipalities (500 to 999 employees). However, in looking at the near-term, the medium sized municipalities appear to have relatively high expectations about adopting key technologies. As indicated earlier, overall, the municipalties have a lower rate of adoption and lower expectations for new technology adoption than either the federal or provincial government departments/ministries surveyed.

Results of Question 3

## TABLE 29: LOCAL ADMINISTRATION

SIC 951

Percent of Orginizations Planning to Adopt New Technologies by Employment Size (1)

| Technologies | Before 1985 | | | 1985-1990 | | | 1990-1995 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Medium | Large | Total | Medium | Large | Total | Medium | Large | Total |
| **SERVICE DELIVERY TECHNOLOGIES** | | | | | | | | | |
| On-Line Client Data Bases | 67 | 86 | 81 | - | 43 | 31 | - | - | - |
| Direct Data Entry from Field | 33 | 71 | 61 | 33 | 43 | 40 | - | - | - |
| Electronic Processing of Service Requests (e.g. test claim validity) | 0 | 57 | 42 | - | 14 | 10 | 33 | 14 | 19 |
| Electronic Service Delivery | 0 | 29 | 21 | 33 | 29 | 30 | - | 29 | 21 |
| Computerized Inventory Control | 33 | 43 | 40 | 68 | 43 | 49 | - | - | - |
| **DESIGN TECHNOLOGIES** | | | | | | | | | |
| Computer-Aided Design (CAD) | 33 | 0 | 9 | - | 86 | 63 | - | - | - |
| Computer-Aided Engineering (CAE) | 33 | 14 | 19 | - | 71 | 52 | - | - | - |
| Computer-Aided Mapping | 0 | 43 | 31 | 67 | 71 | 70 | - | - | - |
| Computer-Aided Project Management | 0 | 43 | 31 | 33 | 71 | 61 | - | - | - |
| 4th Generation Computer Languages | 33 | 14 | 19 | - | - | - | - | - | - |
| Other | 0 | 0 | 0 | - | 14 | 10 | - | - | - |
| **OFFICE AUTOMATION TECHNOLOGIES** | | | | | | | | | |
| Mainframe/Minicomputers | 67 | 71 | 70 | 33 | 29 | 30 | - | - | - |
| Word Processing | 100 | 100 | 100 | - | 14 | 10 | - | - | - |
| Microcomputers | 67 | 100 | 91 | 67 | 14 | 28 | - | - | - |
| Data Base Services (External) | 67 | 57 | 60 | 33 | 29 | 30 | - | - | - |
| Electronic Filing | 33 | 50 | 45 | 67 | - | 55 | 33 | - | 10 |
| Internal Data Base Management Systems | 33 | 43 | 40 | 33 | 71 | 61 | 33 | - | 10 |
| Local Area Networks (LANs) | 33 | 57 | 51 | - | 43 | 31 | - | - | - |
| Computerized Decision Support Systems | 0 | 14 | 10 | 67 | 29 | 39 | 33 | 43 | 40 |
| Voice Activated Computers | 0 | 0 | 0 | 67 | - | 18 | 33 | 71 | 61 |
| Artificial Intelligence/Expert Systems | 0 | 0 | 0 | 33 | - | 9 | 33 | 71 | 61 |
| Fully Integrated Work Stations | 33 | 14 | 19 | 33 | 42 | 40 | - | 29 | 21 |
| **TELECOMMUNICATIONS TECHNOLOGIES** | | | | | | | | | |
| Private Automatic Branch Exchange (PABX) | 0 | 29 | 21 | - | 29 | 21 | 33 | - | 9 |
| Electronic Mail | 33 | 14 | 19 | - | 86 | 63 | 33 | - | 9 |
| Voice Mail | 0 | 0 | 0 | - | 29 | 21 | 33 | 29 | 30 |
| Facsimile with Built-In Microprocessor (FAX) | 0 | 0 | 0 | - | 29 | 21 | 67 | 43 | 49 |
| Satellite/Microwave Systems | 0 | 0 | 0 | - | - | - | 33 | 43 | 40 |
| Videotex | 0 | 0 | 0 | 33 | - | 9 | - | 29 | 21 |
| Video Conferencing | 0 | 0 | 0 | 33 | 29 | 30 | 33 | 14 | 19 |
| Fibre Optics | 0 | 0 | 0 | - | 14 | 10 | 33 | - | 9 |

(1) '0' used prior to 1985 to indicate have not adopted. '-' used for period 1985-1990 and 1990-1995 to indicate respondents, at the time of survey, are not planning to adopt this technology or 'don't know'. Responses are not mutually exclusive.

### 3.1.1 Service Delivery Technologies

- Over 85 percent of the large and 65 percent of the medium sized muncipalities report already having on-line client data bases.

- Similarly, over 70 percent of the larger municipalities and 30 percent of the medium municipalities currently have direct data entry from the field. By 1990, all of the large municipalities expect adoption of direct data entry from the field while approximately two-thirds of the medium municipalities foresee adopting these technologies. The expert interviews suggest direct data entry applications will be widespread throughout the local government sector over the next five years in such areas as policing and water meter reading, to name just two.

- Over 55 percent of the larger municipalities report having electronic processing of service requests and 29 percent report having some form of electronic service delivery while medium muncipalities currently report neither, but a third of the medium sized municipalities expect to adopt electronic service delivery by 1990.

- 40 percent of the Municipalities are currently using computerized inventory control and further adoption is planned in the next five years, particularly by the medium sized municipalities.

### 3.1.2 Design Technologies

- CAD, CAE and computer-aided mapping and project management are expected to be in wide use during the near-term (generally over 60 percent) while

currently, fewer than 10 percent of the municipalities report using CAD, fewer than 20 percent CAE, and about 30 percent computer-aided mapping and project management.

- Approximately 20 percent of the municipalities report using 4th generation computer languages but no further adoption is planned over the 1985 to 1995 period.

### 3.1.3 Office Automation Technologies

- Computers and word processing are already widely adopted by municipalities with further diffusion expected in the near-term.

- External data base services and internal data base management services are already widely adopted, 60 percent and 40 percent, respectively, with all municipalities expecting to be using these by the end of the near-term.

- Currently, 45 percent of the municipalities already use electronic filing with major increases expected by the medium sized municipalities. Only 19 percent of the municipalities now use fully integrated work stations but further usage is planned to 1995.

- LANs are currently used by over 55 percent of the larger municipalities and one-third of the medium local governments with the remainder of the larger municipalities expecting to in the near-term.

- About 10 percent of the municipalities are currently using computerized decision support systems. Just under 50 percent expect in the near-term and most municipalities expect to by the mid-term.

### 3.1.4 Telecommunications Technologies

- All of the municipalities have a PABX or will by 1990. (Note: Some respondents appear confused about what is a PABX. A review of questionnaires indicates that many municipalities already have a PABX although they did not check off this technology on their questionnaires.)

- Just under 20 percent of the municipalities currently use some form of electronic mail and over 80 percent expect to in the near-term.

- Currently, none of the municipalities in the survey are using a 'smart' FAX, satellite/microwave system, videotex, video conferencing or fibre optics. Only modest adoption is expected in the near-term and somewhat further adoption in the mid-term. The significantly lower expectations for adoption of these technologies relative to the Federal and Provincial Public Administration may be explained by the smaller geographic extent of Local Government jurisdictions.

## 3.2 Forces Driving the Need to Adopt New Technology

Table 30 summarizes the results of the survey on the three most critical forces driving the need of municipalities to adopt new technology. The weighted importance of each factor is also shown. Overall, three factors dominated the responses of municipalities. Ranked in order of importance, they are:

| | Overall Weighted Importance |
|---|---|
| Increased productivity | 1.5 |
| Lower costs | 1.3 |
| Increased management information | 1.0 |

Results of Question 4

TABLE 30: LOCAL ADMINISTRATION

SIC 951

Most Important Factors Driving the Need to Adopt New Technologies

| Factor | | Percent of Organizations by Employment Size: Medium (500-999) | Large (1000+) | Total |
|---|---|---|---|---|
| COMPETITIVE PRESSURES | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 10 |
| | Third | 0 | 14 | 10 |
| | Weighted Importance (1) | 0.0 | 0.4 | 0.3 |
| STRATEGIC | First | 33 | 0 | 9 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 10 |
| | Weighted Importance | 1.0 | 0.1 | 0.4 |
| CUSTOMER DEMANDS FOR CHANGES | First | 0 | 0 | 0 |
| | Second | 33 | 0 | 9 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.7 | 0.0 | 0.2 |
| INCREASE PRODUCTIVITY | First | 33 | 57 | 51 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 1.0 | 1.7 | 1.5 |
| INCREASE QUALITY | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 10 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.0 | 0.3 | 0.2 |
| INCREASE MANAGEMENT INFORMATION | First | 0 | 29 | 21 |
| | Second | 0 | 14 | 10 |
| | Third | 33 | 14 | 19 |
| | Weighted Importance | 0.3 | 1.3 | 1.0 |
| LOWER COSTS | First | 33 | 14 | 19 |
| | Second | 0 | 43 | 31 |
| | Third | 0 | 14 | 10 |
| | Weighted Importance | 1.0 | 1.4 | 1.3 |
| INCREASE SKILLS/ ORGANIZATIONAL CAPABILITY | First | 0 | 0 | 0 |
| | Second | 33 | 14 | 19 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.7 | 0.3 | 0.4 |
| ALL OTHERS | First | 0 | 0 | 0 |
| | Second | 33 | 0 | 9 |
| | Third | 33 | 0 | 9 |
| | Weighted Importance | 1.0 | 0.0 | 0.3 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

Also cited as important themes in their responses was the need

- to stay current with the Province, other municipalities and the private sector, and

- to meet client demands or expectations for effective service delivery.

Clearly, the need to live with fiscal restraint, limits on staff increases and declining transfer payments from the Province, while trying to meet higher public and client demands is the main force driving municipalities to adopt new technology.

## 3.3 Factors Which Could Slow the Rate of Technology Adoption

Municipalities were also asked to name the three most important factors which could slow the rate of technology adoption. Table 31 summarizes the percentage of municipalities which identified each factor as first, second or third in importance. Again, the weighted importance of each factor is shown.

Similarly, a limited number of factors were identified which could slow the rate of technology adoption. Overall, for the municipalities surveyed, the critical factors which could slow their rate of technology adoption are:

| | Overall Weighted Importance |
|---|---|
| Ability to finance | 2.1 |
| Unwilling to change | 1.1 |
| Lack of skills or know-how | 0.8 |
| Cost of new technology | 0.6 |

Results of Question 5

## TABLE 31: LOCAL ADMINISTRATION

SIC 951

Most Important Factors that Could Slow the Rate of New Technology Adoption

| Factor | | Percent of Organizations by Employment Size: Medium (500-999) | Large (1000+) | Total |
|---|---|---|---|---|
| ABILITY TO FINANCE | First | 67 | 71 | 70 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance (1) | 2.0 | 2.1 | 2.1 |
| COST OF NEW TECHNOLOGY | First | 0 | 14 | 10 |
| | Second | 0 | 14 | 10 |
| | Third | 33 | 0 | 9 |
| | Weighted Importance | 0.3 | 0.7 | 0.6 |
| POOR ECONOMIC CONDITIONS | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 33 | 0 | 9 |
| | Weighted Importance | 0.3 | 0.0 | 0.1 |
| EMPLOYEE ACCEPTANCE | First | 0 | 0 | 0 |
| | Second | 33 | 0 | 9 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 0.7 | 0.0 | 0.2 |
| LACK OF SKILLS AND/OR KNOW-HOW TO IMPLEMENT | First | 0 | 14 | 10 |
| | Second | 0 | 29 | 21 |
| | Third | 0 | 14 | 10 |
| | Weighted Importance | 0.0 | 1.1 | 0.8 |
| LACK OF NEW TECHNOLOGY STANDARDIZATION | First | 0 | 0 | 0 |
| | Second | 0 | 14 | 10 |
| | Third | 0 | 43 | 31 |
| | Weighted Importance | 0.0 | 0.7 | 0.5 |
| UNWILLINGNESS TO CHANGE | First | 33 | 0 | 9 |
| | Second | 33 | 43 | 40 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 1.7 | 0.9 | 1.1 |
| ALL OTHERS | First | 0 | 0 | 0 |
| | Second | 33 | 0 | 9 |
| | Third | 0 | 14 | 10 |
| | Weighted Importance | 0.7 | 0.1 | 0.3 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

The ability to finance was ranked higher in overall weighted importance by local governments than by any other service or manufacturing sector industry surveyed. Similarly, a lack of willingness to change was ranked higher than by any other sector.

It was particularly high for the medium sized muncipalities (1.7) surveyed. These two factors, as suggested in the introduction to this chapter, probably help to explain the technology follower position of Local Administration.

Lack of skills was cited as important (1.1) for larger municipalities but was not considered a key factor by medium muncipalities (0.0). The cost of new technology was an important contributing factor, however, the availability of discretionary funds appears much more important than the cost of new technology.

Employee acceptance was mentioned by less than 10 percent of the municipalities and union resistance to new technology was not mentioned by any respondents.

Results of Question 1

## TABLE 32: LOCAL ADMINISTRATION

SIC 951

Local Government Administration
Gross Domestic Production in Ontario

Average Annual Compound Rate of Change (in Constant Dollars) (1)

| Organizations by Employment Size | Estimated 1982-1983 | Estimated 1983-1984 | Estimated 1984-1985 | Expected 1985-1990 | Expected 1990-1995 |
|---|---|---|---|---|---|
| Medium (500-999) | 2.5 | 2.5 | 2.0 | 2.0 | 3.0 |
| Large (1000+) | 3.0 | 3.0 | 3.0 | 3.5 | 3.0 |
| Total | 2.5 | 3.0 | 2.5 | 3.0 | 3.0 |

(1) Rounded to closest 0.5%

## 4.0 INDUSTRY OUTLOOK TO 1995

This chapter describes the views of municipal respondents on the outlook for the Local Administration Gross Domestic Product (GDP) in Ontario, investment plans, aggregate employment and changes in occupational structure to 1995.

### 4.1 Output to 1995

Between 1971 and 1981, Local Administration GDP in Ontario increased in constant dollars at an average annual rate of 3.2 percent. In 1981 to 1982, it expanded by 4.7 percent. Municipal respondents were asked to estimate future increases in Local Administration GDP in Ontario in constant dollars. The results are shown in Table 32.

The respondents indicated a 2.5 percent rate from 1982 to 1983, 3.0 percent from 1983 to 1984 and 2.5 percent from 1984 to 1985. They foresee a 3.0 percent rate from 1985 to 1995. Experts in the field tended to confirm this general view. One expert estimated 1 to 2 percent per annum growth from 1985 to 1995. Another expert predicted growth at comparable or slightly below growth in the overall Ontario Gross Domestic Product (GDP). Larger municipalities (1,000 or more employees) were consistently higher in their estimates and expectations of rates of growth than the medium sized municipalities (500 to 999 employees).

### 4.2 Investment Patterns

As indicated earlier, we are hesitant to report the overall estimates of capital investment expected based on the municipal sample. However, the survey results do suggest that approximately 90 percent of Local Government capital investment will be on structures and buildings and a small portion of this investment - perhaps 2 to 5 percent, on average - is related to new technology. The high percentage of Local Administration's

capital investment on 'bricks and mortar' may be explained by the nature of local government which is responsible for the construction of municipal public works (e.g., roads, sidewalks, sewers, waterchains, sewage and water treatment). Of all the industries surveyed, Local Administration had the highest percentage of capital investment on structures and buildings.

Of the 10 percent of total capital investment on machinery and equipment, only about a quarter of it (23 to 25 percent) is related to new technology. Again, the percentage of machinery and equipment related to new technology was by far the lowest of all industries surveyed and may again be explained by the nature of local government whose largest share of machinery and equipment expenditures are related rolling stock (e.g., buses, trucks, cruisers) and public works equipment.

### 4.2.1 Justifying Financial Investment in New Technology

Municipal respondents were asked how they evaluate and justify financial investments in new technology. The results suggest that approximately 70 percent of the municipalities (including all of the medium) use the pay-back period concept and, on average, are looking for a pay-back in three to five years.

The concept of return on investment is not viewed as appropriate to local government.

Many respondents indicate other considerations are used including:

- political viability,
- increased social benefits,
- cost effectiveness,
- needs assessment, and
- third party appraisal costs and benefits.

### 4.2.2 Source of New Capital Spending

This question is largely inappropriate for Local Administration in that it is difficult to assign the source of the monies for new technologies as they came from general revenues which include municipal taxation, provincial transfer payments and user fees.

## 4.3 Employment to 1995

This section reviews expected trends in employment patterns and the most important factors affecting municipal employment levels.

### 4.3.1 Factors Affecting Employment

When asked to identify the most important factors affecting the municipality's employment level, respondents identified the following ranked according to their weighted importance (see Table 33).

| | Overall Weighted Importance |
|---|---|
| Political environment/community service expectations | 1.5 |
| Revenue base | 1.0 |
| Economic and community growth | 0.9 |

The dominant factor was a wide variety of responses which could be classified as the political environment including community service expectations and willingness to pay for services. The second most commonly cited factor was the revenue base of the municipality. The next most commonly cited factor was economic and community growth.

Results of Question 11a,b,c

## TABLE 33: LOCAL ADMINISTRATION

SIC 951

Most Important Factors Affecting The Organizations' Employment in Ontario

| Factor | | Percent of Organizations by Employment Size | | |
|---|---|---|---|---|
| | | Medium (500-999) | Large (1000+) | Total |
| REVENUE BASE/ FINANCIAL STRENGTH | First | 0 | 29 | 21 |
| | Second | 0 | 29 | 21 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance (1) | 0.0 | 1.4 | 1.0 |
| INTRODUCTION OF NEW TECHNOLOGY | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 33 | 14 | 19 |
| | Weighted Importance | 0.3 | 0.1 | 0.2 |
| PROGRAM DIVERSIFICATION | First | 0 | 0 | 0 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 14 | 10 |
| | Weighted Importance | 0.0 | 0.1 | 0.1 |
| AVAILABILITY OF NECESSARY SKILLS | First | 33 | 0 | 9 |
| | Second | 0 | 14 | 10 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 1.0 | 0.3 | 0.5 |
| ABILITY TO COMPETE | First | 33 | 14 | 19 |
| | Second | 0 | 0 | 0 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 1.0 | 0.4 | 0.6 |
| ECONOMIC GROWTH | First | 33 | 14 | 19 |
| | Second | 67 | 0 | 18 |
| | Third | 0 | 0 | 0 |
| | Weighted Importance | 2.3 | 0.4 | 0.9 |
| POLITICAL ENVIRONMENT | First | 0 | 29 | 21 |
| | Second | 33 | 43 | 40 |
| | Third | 33 | 0 | 9 |
| | Weighted Importance | 1.0 | 1.7 | 1.5 |

(1) Weighted Importance = (First % x 3) + (Second % x 2) + (Third % x 1)

Viewed as marginally important are such factors as:

- the transfer of responsibilities from the province to municipalities,
- the extent of contracting to the private sector,
- the impact of new technology, and
- high labour costs (i.e., resistance of municipal unions).

### 4.3.2 Employment Outlook

In 1984, Ontario municipalities employed approximately 108,000 people based on data from the Ontario Ministry of Municipal Affairs and Housing. Between 1971 and 1981, Local Government Administration employment, based on census data, increased at an average annual compound rate of 3.3 percent. Based on the survey of municipalities (see Table 34), Local Administration employment grew by an average annual compound growth rate of 5.5 percent from 1981 to 1984 and 2.5 percent from 1984 to 1985 but is expected to grow modestly between 1985 and 1990 at 1.5 percent per annum and 1.0 percent per annum from 1990 to 1995. Experts in the field tended to agree with this outlook for modest but sustained future employment growth.

### 4.3.3 Trends in Part-Time Work

Municipal respondents were also asked to indicate their use of part-time employees for the periods 1981, 1984, 1985 and their expectations for 1990 and 1995.

Results of Question 11d

## TABLE 34: LOCAL ADMINISTRATION

SIC 951

Organizations' Employment Trends in Ontario

| Organization by Employment Size | Total Employment and Average Annual Compound Rate of Change (1) | | | |
|---|---|---|---|---|
| | Estimated Rate | | Expected Rate | |
| | 1981-1984 | 1984-1985 | 1985-1990 | 1990-1995 |
| Medium (500-999) | 1.0 | 0.0 | 0.5 | 0.5 |
| Large (1000+) | 6.5 | 3.0 | 2.0 | 1.0 |
| Total | 5.5 | 2.5 | 1.5 | 1.0 |

(1) Rounded to closest 0.5%.

Municipalities report the highest use of part-time employees among the three levels of government. Currently, approximately one-third of the work force is part-time employees. The primary reason for this is the use of part-time employees in such community services as recreation and library programs including clerk/typists, librarian and instructors. Municipalities surveyed foresee a nominal increase in the use of part-time staff from 34 percent in 1985 to 35 percent in 1990 and 36.5 percent in 1995.

## 4.4 Changes in Occupational Structure

Table 35 shows expected trends in occupational structure (i.e., percent of total employment by occupation) in Local Administration from 1981 to 1995 by major occupational categories. The direction of change for specific selected occupation is shown using the following indicators: + increase; - decrease; and o no change.

Respondents generally anticipate little change from the current occupational structure. Exhibit 21 shows the direction of change in the major occupational categories from 1971 to 1981 based on Census data. Also shown in the exhibit is the direction of change for these occupational groups based on the survey findings.

Results of Question 12

## TABLE 35: LOCAL ADMINISTRATION

SIC 951

Trends in Organizations' Occupational Structure

| Occupations | Percent of Total Employment by Selected Occupational Categories | | | | |
|---|---|---|---|---|---|
| | Estimated | | | Expected | |
| | 1981 | 1984 | 1985 | 1990 | 1995 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 9.9 | 10.0 | 10.2 | 10.5 | 10.6 |
| • Government Administrators | | 0 | + | 0 | 0 |
| • Government Inspectors and Regulators | | 0 | 0 | 0 | + |
| • Financial Officers | | 0 | + | + | 0 |
| • Personnel and Related | | 0 | + | 0 | 0 |
| • All Other Managerial | | 0 | 0 | 0 | 0 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 9.8 | 10.9 | 11.5 | 10.9 | 11.0 |
| • Engineers | | + | + | 0 | 0 |
| • Scientists | | + | + | 0 | 0 |
| • Technicians and Technologists | | 0 | + | - | 0 |
| • Draughtsmen | | + | 0 | - | 0 |
| • Systems Analysts and Computer Programmers | | + | + | 0 | + |
| • All Other Natural Sciences | | + | + | - | 0 |
| CLERICAL | 12.2 | 12.4 | 11.7 | 11.4 | 10.9 |
| • Clerical Supervisors | | 0 | - | - | - |
| • Secretaries | | 0 | - | - | - |
| • Typists/Clerk Typists (includes Word Processing Operators) | | + | - | - | - |
| • Bookkeepers and Accounting Clerks | | 0 | - | - | - |
| • Statistical Clerks | | 0 | - | - | - |
| • EDP Equipment Operators | | 0 | - | - | - |
| • Library File Clerks | | 0 | - | - | - |
| • General Office Clerks | | + | - | - | - |
| • All Other Clerks | | 0 | - | - | - |
| OTHER OCCUPATIONS | 68.1 | 66.7 | 66.6 | 67.2 | 67.5 |
| TOTAL | 100% | 100% | 100% | 100% | 100% |

+ increase - decrease 0 no change

## EXHIBIT 21

## TRENDS IN OCCUPATIONAL STRUCTURE, 1971 to 1995

| | Census (Actual) | Based on Survey | | |
|---|---|---|---|---|
| | 1971-1981 | 1981-1985 | 1985-1990 | 1990-1995 |
| • Managerial, Administrative & Related | + | + | + | + |
| • Natural Sciences, Engineering & Mathematics | + | + | + | + |
| • Clerical | 0 | - | - | - |
| • All Others | - | - | + | + |

+ Increase
0 Little or no change
- Decrease

Overall, respondents expect:

- Nominal increases in the share of employment in Managerial occupations but they do not expect the degree of change experienced between 1971 and 1981.

- Nominal increases in Engineering, Mathematics and Related occupations.

- Some decrease in Clerical and All Other occupations over the long term.

Results of Question 6

## TABLE 36: LOCAL ADMINISTRATION

SIC 951

Impact of Technology on Selected Occupations in Organizations 1985-1995

| Occupations | Percent of Organizations | | |
|---|---|---|---|
| | Oversupply | Shortage | No Response |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | |
| • Government Administrators | 10 | 60 | 30 |
| • Government Inspectors and Regulators | 0 | 60 | 40 |
| • Financial Officers | 51 | 40 | 9 |
| • Personnel and Related | 21 | 51 | 28 |
| • All Other Managerial | 30 | 42 | 28 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | |
| • Engineers | 42 | 19 | 39 |
| • Scientists | 30 | 0 | 70 |
| • Technicians and Technologists | 45 | 43 | 13 |
| • Draughtsmen | 82 | 9 | 9 |
| • Systems Analysts and Computer Programmers | 10 | 79 | 10 |
| CLERICAL | | | |
| • Clerical Supervisors | 81 | 0 | 19 |
| • Secretaries | 69 | 21 | 10 |
| • Typists/Clerk Typists (includes Word Processing Operators) | 90 | 0 | 10 |
| • Bookkeepers and Accounting Clerks | 82 | 9 | 9 |
| • Statistical Clerks | 40 | 9 | 51 |
| • EDP Equipment Operators | 72 | 10 | 18 |
| • Library File Clerks | 61 | 9 | 30 |
| • General Office Clerks | 70 | 0 | 30 |
| • All Other Clerks | 40 | 9 | 51 |
| OTHER OCCUPATIONS | 15 | 0 | 85 |

## 5.0 EMPLOYMENT EFFECTS OF NEW TECHNOLOGY

This chapter reviews the survey results from the municipal respondents on the employment effects of new technology in terms of skills match and requirements and the impact on skill levels and job content. Training costs, particularly as they relate to new technology, are also discussed.

### 5.1 Effects on Occupations

Table 36 summarizes municipalities' expectations of technology impact on occupational requirements. Many managerial, professional and technical occupations are expected to be in short supply. The following is a list of occupations in which 35 percent or more of the municipalities expect a shortage of skills due to the adoption of new technology within individual organizations:

- Government administrators (60%),
- Government inspectors (60%),
- Financial officers (40%),
- Personnel and related (51%),
- All other managerial (42%), and
- Systems analysts/computer programmers (79%).

The occupations in which 35 percent or more of the municipalities expect an oversupply of skills within their organizations due to the adoption of new technology are:

- Financial officers (51%),
- Engineers (42%),
- Technicians and technologists (45%),
- Draughtsmen (82%),
- Clerical supervisors (81%),

Results of Question 7

## TABLE 37: LOCAL ADMINISTRATION

SIC 951

Steps Organizations Will Likely Take to Deal With an OVERSUPPLY of Skills 1985-1995

| Occupations | Most Commonly Cited | Second Most Common | Third Most Common |
|---|---|---|---|
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | |
| • Government Administrators | Early Retirement | Downgrade | (1) |
| • Financial Officers | Attrition | Retrain | Early Retirement |
| • Personnel and Related | Attrition | Lateral Transfer | Upgrade |
| • All Other Managerial | Attrition | Retrain | (1) |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | |
| • Engineers | Attrition | Retrain | Lateral Transfer |
| • Scientists | Retrain | Lateral Transfer | (1) |
| • Technicians and Technologists | Retrain | Attrition | Lateral Transfer |
| • Draughtsmen | Attrition | Retrain | Layoff |
| • Systems Analysts and Computer Programmers | Attrition | Early Retirement | (1) |
| CLERICAL | | | |
| • Clerical Supervisors | Attrition | Retrain | Job Share |
| • Secretaries | Attrition | Retrain | Early Retirement |
| • Typists/Clerk Typists (includes Word Processing Operators) | Attrition | Retrain | Lateral Transfer |
| • Bookkeepers and Accounting Clerks | Attrition | Retrain | Upgrade |
| • Statistical Clerks | Retrain | Attrition | Lateral Transfer |
| • EDP Equipment Operators | Attrition | Retrain | Lateral Transfer |
| • Library File Clerks | Retrain | Attrition | Layoff |
| • General Office Clerks | Attrition | Retrain | Lateral Transfer |
| • All Other Clerks | Retrain | Attrition | Lateral Transfer |

(1) only two steps mentioned.

- Secretaries (69%),
- Typists, including word processing operators (90%),
- Bookkeepers and accounting clerks (82%),
- Statistical clerks (40%),
- EDP equipment operators (72%),
- Library/file clerks (61%),
- General office clerks (70%), and
- All other clerks (40%).

Generally, respondents are ambiguous about the impact of new technology on three of the selected occupations: Financial officers, all other managerial and technicians and technologists, as each were identified by a significant percentage of municipalities as an expected oversupply and shortage of skills due to the adoption of new technology.

## 5.2 Likely Steps to Deal with Skills Oversupply

In dealing with a potential oversupply of skills in their organizations, the most commonly cited steps by occupation are shown in Table 37 and summarized below in terms of frequency cited.

| | Frequency of Appearance in Table 37 | | |
|---|---|---|---|
| Response | Most Common | Second | Third |
| Attrition | 12 | 4 | |
| Retrain | 5 | 10 | |
| Lateral Transfer | | 2 | 7 |
| Layoffs | | | 2 |
| Upgrade | | | 2 |
| Downgrade | | 1 | |
| Early Retirement | 1 | 1 | 2 |
| Job Sharing | | | 1 |

Results of Question 8

## TABLE 38: LOCAL ADMINISTRATION

SIC 951

Steps Organizations Will Likely Take to Deal With a SHORTAGE of Skills 1985-1995

| Occupations | Most Commonly Cited | Second Most Common | Third Most Common |
|---|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE AND RELATED** | | | |
| • Government Administrators | Upgrade | Retrain | Recruit |
| • Government Inspectors and Regulators | Upgrade | Retrain | Recruit |
| • Financial Officers | Upgrade | Recruit | (1) |
| • Personnel and Related | Upgrade | Retrain | Recruit |
| • All Other Managerial | Retrain | Upgrade | Recruit |
| **NATURAL SCIENCES, ENGINEERING AND MATHEMATICS** | | | |
| • Engineers | Recruit | Retrain | (1) |
| • Technicians and Technologists | Recruit | Upgrade | Retrain |
| • Draughtsmen | Recruit | (2) | (2) |
| • Systems Analysts and Computer Programmers | Recruit | Retrain | Upgrade |
| **CLERICAL** | | | |
| • Secretaries | Recruit | Upgrade | (1) |
| • Bookkeepers and Accounting Clerks | Upgrade | (2) | (2) |
| • Statistical Clerks | Recruit | (2) | (2) |
| • EDP Equipment Operators | Retrain | Recruit | (1) |
| • Library File Clerks | Recruit | (2) | (2) |
| • All Other Clerks | Recruit | (2) | (2) |

(1) Only two steps mentioned.
(2) Only one step mentioned.

The preferred measure for dealing with the oversupply of skills is attrition, followed by retraining and lateral transfers and fourth, by early retirement. Layoffs were infrequently mentioned.

## 5.3 Likely Steps to Deal with Skills Shortages

In coping with anticipated skill shortages, the most commonly cited responses by municipalities for specific occupations are shown in Table 38 and summarized below.

| | Frequency of Appearance on Table 38 | | |
|---|---|---|---|
| Response | Most Common | Second | Third |
| Recruit | 8 | 2 | 4 |
| Upgrade | 5 | 3 | 1 |
| Retrain | 2 | 5 | 1 |

Recruitment and upgrading are the preferred measures for coping with skill shortages followed by retraining.

## 5.4 Technology Impact on Skill Levels and Job Content

Municipal respondents were asked to rank the impact of new technologies on selected occupations in terms of:

- skills required,
- time to achieve proficiency, and
- knowledge of organizations operations,

by indicating an increase (+), a decrease (-) or remain about the same (o). The survey results are reported in Table 39.

Exhibit 22, below, provides a further summary of the pattern of responses in terms of the consensus view of respondents on the impact of new technology on skills, time to achieve proficiency and knowledge of the organization.

Results of Question 9

## TABLE 39: LOCAL ADMINISTRATION

SIC 951

Impact of Technology on Skill Levels and Job Content

(1) Percent of Organizations

| Occupations | Skills Required | | | Time to Achieve Proficiency | | | Knowledge of Organization's Operations | | |
|---|---|---|---|---|---|---|---|---|---|
| | + | - | 0 | + | - | 0 | + | - | 0 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | | | | | | | |
| • Government Administrators | 100 | 0 | 0 | 51 | 0 | 49 | 90 | 10 | 0 |
| • Government Inspectors and Regulators | 69 | 0 | 31 | 9 | 0 | 91 | 37 | 0 | 63 |
| • Financial Officers | 79 | 21 | 0 | 30 | 21 | 49 | 58 | 0 | 42 |
| • Personnel and Related | 100 | 0 | 0 | 51 | 0 | 49 | 69 | 0 | 31 |
| • All Other Managerial | 100 | 0 | 0 | 68 | 0 | 32 | 88 | 0 | 12 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | | | | | | | |
| • Engineers | 69 | 10 | 21 | 51 | 0 | 49 | 58 | 0 | 42 |
| • Scientists | 100 | 0 | 0 | 77 | 0 | 23 | 100 | 0 | 0 |
| • Technicians and Technologists | 100 | 0 | 0 | 62 | 14 | 24 | 71 | 0 | 29 |
| • Draughtsmen | 58 | 31 | 10 | 40 | 31 | 29 | 48 | 21 | 31 |
| • Systems Analysts and Computer Programmers | 90 | 0 | 10 | 82 | 0 | 18 | 90 | 0 | 10 |
| CLERICAL | | | | | | | | | |
| • Clerical Supervisors | 91 | 9 | 0 | 40 | 21 | 39 | 29 | 10 | 61 |
| • Secretaries | 81 | 19 | 0 | 19 | 31 | 50 | 29 | 10 | 61 |
| • Typists/Clerk Typists (includes Word Processing Operators) | 81 | 19 | 0 | 19 | 21 | 60 | 28 | 10 | 61 |
| • Bookkeepers and Accounting Clerks | 55 | 45 | 0 | 22 | 35 | 43 | 20 | 23 | 57 |
| • Statistical Clerks | 72 | 13 | 15 | 13 | 46 | 41 | 26 | 0 | 74 |
| • EDP Equipment Operators | 77 | 23 | 0 | 44 | 23 | 33 | 31 | 0 | 69 |
| • Library File Clerks | 62 | 25 | 13 | 11 | 26 | 62 | 23 | 0 | 77 |
| • General Office Clerks | 70 | 20 | 10 | 20 | 10 | 70 | 28 | 0 | 72 |
| • All Other Clerks | 68 | 32 | 0 | 33 | 17 | 50 | 15 | 0 | 85 |
| OTHER OCCUPATIONS | 100 | 0 | 0 | 0 | 100 | 0 | 0 | 0 | 100 |

+ increase - decrease 0 remain the same

(1) Non-responses excluded.

**EXHIBIT 22**

**GENERAL CONSENSUS ON IMPACT OF NEW TECHNOLOGY**

| | Skills | Time | Knowledge |
|---|---|---|---|
| Managerial, Administrative & Related | + | + | + |
| Natural Sciences, Engineering & Mathematics | + | + | + |
| Clerical | + | o | o |
| All Others | + | - | o |

+ Increase
- Decrease
o About the same

Technology is seen as having a positive impact on the need for more skills in all occupations. Managerial, professional and technical occupations will require more time to achieve proficiency and will need to be more knowledgeable of the organization.

## 5.5 Training Costs and New Technology

Municipal managers estimate that they currently spend, on average, the equivalent 2 percent of total labour costs on training. Medium sized municipalities report spending three to four times more on training than the larger municipalities. Over the next ten years, both expect to be spending considerably more on training. By 1990, larger municipalities expect to double and by 1995, triple their current training budgets. Medium sized municipalities also expect a sizeable increase from 4.5 percent currently to 6.5 percent in 1990 and 8.0 percent in 1995.

Municipalities expect an increasing share of their training budgets to be related to new technology rising from 47 percent currently to 57 and 56 percent in 1990 and 1995 respectively.

TABLE 40

INDUSTRIAL RELATIONS: LOCAL ADMINISTRATION

| UNION | NUMBER OF EMPLOYEES | MAJOR EMPLOYER* | LOCATION | TECHNICAL CHANGE CLAUSE IN AGREEMENT |
|---|---|---|---|---|
| CANADIAN PUBLIC EMPLOYEES (CUPE) | 3,881 | Metropolitan Toronto Municipality - Inside | Toronto | Transfer Arrangements |
| | 2,785 | Metropolitan Toronto Municipality - Outside | Toronto | Training and Transfer Arrangements |
| | 2,166 | Toronto City Corporation - Inside | Toronto | Transfer Arrangements |
| | 1,700 | Ottawa City Corporation | Ottawa | Training, Transfer Arrangements and Severance Pay |
| | 1,600 | Toronto City Corporation - Outside | Toronto | None |
| | 1,600 | Ottawa-Carleton Regional Municipality | Ottawa | None |
| | 728 | North York City Corporation - Outside | North York | Advance Notice |
| | 647 | Etobicoke Borough Corporation - Outside | Etobicoke | Transfer Arrangements, Advance Notice and Other Provisions. |
| | 590 | Scarborough Borough Corporation | Scarborough | None |
| | 584 | Windsor City Corporation | Windsor | Advance Notice, Consultation, Training and Transfer Arrangements |
| | 515 | London City Corporation - Works | London | None |
| POLICE ASSOCIATION | 5,300 | Metropolitan Toronto Police - Uniform | Toronto | None |
| | 714 | Peel Regional Police | Peel Region | None |
| | 690 | Metropolitan Toronto Police - Unit A | Toronto | Transfer Arrangements |
| | 656 | Hamilton-Wentworth Regional Police | Hamilton | None |
| | 563 | Ottawa City Corporation Poilice | Ottawa | None |
| | 553 | Niagara Regional Police | Niagara Region | None |
| FIRE FIGHTERS | 1,300 | Toronto City Corporation Fire Department | Toronto | Advance Notice and Transfer Arrangements |
| | 633 | North York City Corporation Fire Department | North York | Advance Notice, Consultation and Arbitration |
| | 515 | Ottawa City Corporation Fire Department | Ottawa | Transfer Arrangements and Other Provisions |

* Employer with a union agreement covering 500 employees or more. The union agreements above represent 40 percent of unionized employees.

SOURCE: Collective Bargaining Agreement Systems, Ontario Ministry of Labour.

## 6.0 LABOUR RELATIONS ENVIRONMENT

This chapter discusses briefly the historical industrial relations environment in Local Administration and reviews the survey results of municipalities and unions in Local Administration regarding the labour relations environment, particularly as it applies to the introduction of new technology.

### 6.1 Industrial Relations Environment: Historical

Union representation in Local Administration in Ontario, as documented by the Ontario Ministry of Labour, includes 604 different reporting units across the Province with varying employment size. Of these, 116 are documented as having union agreements with technological change clauses.

In 1983, the unions represented 59,784 employees, or approximately 56 percent of the total employed in 1983. The three major unions (see Table 40) are the Canadian Union of Public Employees (CUPE), the Police Association, and the Fire Fighters, accounting for 57, 26 and 14 percent, respectively, of the total unionized work force in Local Administration. In addition, there are 14 other unions which represent 68 reporting units but these account for only 3 percent of total unionized employees.

Coverage under the union agreements includes the following clauses:

- advance notice of impending introduction of changes in machinery, equipment or processes,
- consultation concerning possible effects of planned technological change,
- opportunity for employees affected by technological change to qualify for available jobs, and

- transfer arrangements to a job in a new plant or facility replacing the plant where an employee is displaced or to any other plant.

## 6.2 Trends in Unionization

The survey results indicate that all of the Ontario municipalities surveyed have collective agreements with unions and that approximately 85 percent of their employees are covered by such agreements. The municipalities anticipate little change in the percentage of employees that will be unionized over the next ten years.

## 6.3 Technology Change Clauses

Of the municipalities surveyed, two-thirds of the contracts have a technological change clause. Of those contracts with a technological change clause:

- Approximately 50 to 55 percent cover job security and seniority.
- Approximately 45 percent cover advance notice and prior consultation.
- About 10 percent of the clauses provide for joint management/labour technology committees.
- Approximately 30 percent of the clauses cover retraining.

The municipalities employing 500 to 999 employees generally had better coverage.

## 6.4 Management's Perception of their Union's Position on New Technology

Management and union respondents were asked an open-ended question on what the union's position has been on the adoption of new technologies.

Approximately 45 percent of the management respondents acknowledge in their statements that the union accepts the need for new technology. In survey research, this high percentage rate, given in response to an open-ended, unbiased question, is considered significant. Similarly, about 70 percent of the union respondents identified the necessity to adopt new technology in their answers to this same question.

The pattern of management responses to the above question suggest that the chief concerns of the union, as perceived by the municipal managers, are:

- job security (cited by approximately 60%),
- impact on duties, skills, qualifications (45%), and
- training (30%).

Municipal union leaders indicated a similar set of concerns.

- job security (100%),
- training (70%), and
- consultation (15%).

As can be seen from the above, management perceptions of the unions' chief concerns are close to those of the union leaders.

## 6.5 Nature of Worker Involvement in the Process of Technological Change

Municipalities were asked to indicate whether they had a formal mechanism for employee participation in:

- setting production targets at various levels in the organization,
- improving productivity/quality, and
- adopting new technology.

The pattern of responses suggests that:

- Approximately 90 percent of the municipalities indicated having no formal mechanism for employee participation in setting production targets or that such a mechanism is not appropriate.

- Approximately 50 percent of the municipalities report having a formal mechanism related to improving productivity and/or quality, and

- About 30 percent report such a mechanism related to new technology.

These results are based on unweighted responses from union representatives of seven of the ten municipalities surveyed. Only one of seven union respondents identified formal mechanisms in place related to:

- setting production targets,
- improving productivity/quality, and
- adopting new technology.

## 6.6 Views on Involving Workers in Decisions on Adopting New Technology

Respondents were asked an open-ended question as to what extent and how should management involve employees in decisions on adopting new technology.

The pattern of management responses suggest that:

- over 30 percent preferred full involvement,

- only 12 percent saw little need for any involvement,

- 12 percent saw involvement necessary only to explain the need for new technology, and

- over 20 percent suggested regular information and consultation to aid implementation.

Of the union respondents, 90 percent favoured a high degree of employee involvement at the earliest stages. Many municipal union leaders indicated that problems occur when there is little or no consultation and not when management is open and forthright.

Results of Question 18

TABLE 41: LOCAL ADMINISTRATION

SIC 951

Planning for Technological Change

| Organizations by Employment Size | Strategic Plan | Human Resource Plan | | Capital Investment Plan | | Perceived Integration Between Capital and Human Plans (1) |
|---|---|---|---|---|---|---|
| | Percent of Organizations With Plan | Percent of Organizations With Plan | Length of Planning Horizon | Percent of Organizations With Plan | Length of Planning Horizon | |
| Medium (500-999) | 33 | 33 | 5 years | 33 | 3 years | 1.0 |
| Large (1000+) | 14 | 43 | 4 years | 43 | 5 years | 1.3 |
| Total | 19 | 40 | 5 years | 40 | 5 years | 1.3 |

(1) Using a scale of 1 to 5; 1 represents "Not at all integrated" and 5 "Highly integrated".

## 7.0 PLANNING FOR TECHNOLOGY CHANGE

The following chapter reports results of the survey of Ontario municipalities related to planning for technology change. Table 41 summarizes the results.

Of the municipalities surveyed, only 19 percent report having long term 'strategic' plans. This figure is somewhat misleading as one of two respondents answering affirmatively to having a long term 'strategic' plan cited their long term official plan which is essentially a land use and physical development plan and not a strategic plan for the operations for the municipal corporation. Two of the respondents answering negatively to the question do have components of a strategic plan while another respondent reports it is currently in the process of preparing a strategic plan. Several of the municipalities have multi-year financial plans.

About 40 percent of the municipalities report having a human resource plan with an average planning horizon being four to five years.

A similar percent (40%) of the municipalities report having a capital investment plan dealing with the adoption of new technologies. The average length of these plans is five years. This figure may suggest a higher level of planning activity than is taking place. In the case of at least one municipal respondent answering affirmatively to having such a plan, the plan relates to 'equipment replacement' which is not necessarily related to new technology.

The municipalities who have capital and human resource plans indicate virtually no integration between the two plans - 1.3, based on a scale of 1 - "not at all integrated", to 5 "highly integrated".

## 8.0 SUMMARY OF KEY FINDINGS FOR GOVERNMENT SERVICES

The following summarizes some of the key findings from the survey and expert interviews in the Government Services Industry.

- The Government Services Industry is a strong candidate for the application of new computer and microelectronic information technologies.

- The Federal and Ontario Governments appear fairly close in the rate of adoption and their plans, at this time, for the future. Local Governments, in general, are followers.

- The major factors driving the need for new technology adoption in Public Administration are, in order of importance:

  - to increase productivity,
  - to enhance the skills and capabilities of the organization,
  - to meet more sophisticated needs of clients and to keep pace with related industries, and
  - to lower costs.

- The major factors which slow the rate of technology adoption are, in order of importance:

  - the ability to finance the technology,
  - the lack of skills and know-how to implement the change, and
  - the willingness of decision makers to change.

- On the whole, the Government Service Industry expects comparable or somewhat lower rates of growth in spending during the period 1985 to 1995 (and after discounting for inflation) as was experienced between 1971 to 1981 which in turn were relatively close to real growth in the Ontario Gross Domestic Product (1971 to 1981).

- Employment in Public Administration is expected to grow at rates well below those experienced between 1971 to 1981. The survey suggests aggregate growth of less than 0.5 percent per annum for the Industry. The major factors affecting future employment levels are, in order of importance:

  - public policy and government restraint,
  - economic growth, and a distant third factor is,
  - technology.

  In this regard, technology is generally viewed by managers in Public Administration as a means of meeting increased demands with existing staff levels.

- Relatively nominal changes in the occupational structure are expected. A higher proportion of managerial, professional and technical employees and a lower proportion of Clerical employees is anticipated. But the extent of change expected to take place over the next ten years will be no greater and probably less than what took place from 1971 to 1981.

- Technology is expected to cause a skill shortage in some occupations and an oversupply in others. The most prominent examples are a shortage of managers and systems analysts/computer programmers and an oversupply in most Clerical occupations.

- In terms of coping with skill shortages, the steps most likely to be taken by government agencies will be, in order of importance - retraining, recruiting and upgrading. In terms of dealing with the oversupply of skills, the steps most likely

to be taken by government organizations will be, in order of importance - attrition, retraining and lateral transfers.

- Managers in Public Administration expect new technologies to increase the skills of virtually every occupation and, for many occupations, more time will be required to achieve proficiency and employees will need to be more knowledgeable of their organizations.

- Governments currently spend 1.5 to 3 percent of total labour costs on training. The federal government and the province do not expect much increase over the next decade, but municipalities expect the ratio to increase to 6 to 8 percent. Currently 30 to 45 percent of their training budgets are currently related to the introduction of new technology. Managers expect the proportion related to new technology to increase to 45 to 55 percent over the next ten years.

- Managers expect little change over the next decade in the percent of total employment that is represented by a collective bargaining agent.

- Most contracts in the federal and Ontario government have a technological change clause. Municipal contracts are much less likely to have such a clause. The clauses cover, in order of frequency - advance notice, consultation, job security and joint labour/management committees.

- Unions in the public sector are not opposed to the introduction of new technology but they are concerned about, in order of importance - job security, retraining, health and safety and job content.

- Many managers and union leaders believe a high degree of employee involvement, consultation and open communication will aid the implementation of new technology.

- Both the Federal and Ontario Governments have recently organized special interdepartmental task forces of senior civil servants to act as catalysts and to smooth the implementation of new information technologies. The Ontario Government, in particular, is expected in the near future, to require ministries to have an integrated strategic plan for information technology, systems development and human resources before funding for new technology would be allocated. Such steps will increase the planning capability of organizations in their adoption of new technology. Local Governments appear to lag senior governments in their planning capability related to new technology.

## PART IV - APPENDICES

Part IV of this report presents the appendices referred to throughout the report.

These appendices are:

| Appendix | Title | Reference |
|---|---|---|
| A | Firm Employment Size Categories Used in the Survey of the Government Services Industry | Part I |
| B | Questionnaire | Part I |
| | Responses by Question | Part III |
| | • Federal Government | |
| | • Provincial Government | |
| | • Local Government | |
| C | Reliability of the Sample | Part I |
| D | Historical Tables | Part II |
| | • Federal Government | Page D.1 |
| | • Provincial Government | Page D.13 |
| | • Local Government | Page D.24 |

APPENDIX A

# FIRM EMPLOYMENT SIZE CATEGORIES USED IN THE SURVEY OF THE GOVERNMENT SERVICES INDUSTRY

## FIRM EMPLOYMENT SIZE CATEGORIES USED IN THE SURVEY OF THE GOVERNMENT SERVICES INDUSTRY

| FEDERAL | | PROVINCIAL | | LOCAL | |
|---|---|---|---|---|---|
| Size Categories Used to Stratify the Sample Frame | Size Categories Used to Weight and Report Survey Results | Size Categories Used to Stratify the Sample Frame | Size Categories Used to Weight and Report Survey Results | Size Categories Used to Stratify the Sample Frame | Size Categories Used to Weight and Report Survey Results |
| Number of Employees | | | | | |
| 50 - 99 | Small n.a. | 50 - 99 | Small n.a. | 50 - 99 | Small n.a. |
| 100 - 199 | | 100 - 199 | | 100 - 199 | |
| 200 - 499 | | 200 - 499 | Medium 200-999 | 200 - 499 | |
| 500 - 999 | Medium 500-999 | 500 - 999 | | 500 - 999 | Medium 500-999 |
| 1000 - 1499 | Large 1,000 or more | 1000 - 1499 | Large 1,000 or more | 1000 - 1499 | Large 1,000 or more |
| 1500 - 2499 | | 1500 - 2499 | | 1500 - 2499 | |
| 2500 - 4999 | | 2500 - 4999 | | 2500 - 4999 | |
| 5000 or more | | 5000 or more | | 5000 or more | |

n.a. Not applicable

APPENDIX A

APPENDIX B

# QUESTIONNAIRE

AND

# RESPONSES BY QUESTION

# ONTARIO TASK FORCE ON EMPLOYMENT AND NEW TECHNOLOGY

**FEDERAL GOVERNMENT**
**(SIC 909)**
**QUESTIONNAIRE**

Currie, Coopers & Lybrand

## INTRODUCTION

Thank you for agreeing to participate in the study. It is being carried out for the Ontario Task Force on Employment and New Technology, a joint labour-management group. Their mandate is to examine the extent and nature of employment change likely to result from the introduction and application of new technology in Ontario over the next ten years.

**You Will Receive The Survey Results**
As a participant, you will receive a report on the survey results for your industry.

**All Responses Will Be Confidential**
All responses will be held in strictest confidence. Responses will be analysed and used only at an industry-wide level.

**Both Organized Labour and Management Are Being Surveyed**
Management and organized labour participants, in the case of unionized firms, will both receive a questionnaire. We realize that labour participants may not be able to answer some of the questions. In particular, they may find difficulty in answering questions: 10, 11, 12, 13 and 17.

**Participants May Want to Consult Key Resource People in Responding**
The questionnaire is not necessarily meant to be completed by only one respondent. It may be appropriate and even desirable for survey participants to consult other key resource people in their organization before responding to the questionnaire. Respondents should indicate on the Participant Information (p.4), the "principle respondent" and "other respondents" as well as the Section(s) of the questionnaire to which they contributed.





**You Will Save Time if Information is Filled in Before the Interview**
A number of questions relate to your organization's past or present workforce and future plans. We are requesting management respondents to provide accurate information from their organization's records in advance of the interview. This step will reduce the time needed for the actual interview and also make it more meaningful. The Participant Information (p.4) and the following questions should be filled in prior to the management interview: 3, 6 to 13 inclusive, 15 and 17.

**Group Interviews Are Possible**
In some cases the principle respondent may want to arrange a group interview between himself, key resource people and our consultant. We would welcome such an arrangement. This option is open to either management or labour participants.

**You May Wish to Complete the Entire Questionnaire Before the Interview**
The entire questionnaire could be completed in advance of the interview. If this is convenient, please do so. We would, however, still wish to spend a half-hour with you to review your responses.

**Your "Best" Estimate**
Where estimates are required, we are asking respondents to provide us with their "best estimate". Estimating future trends is difficult. Our premise is that an expert inside the organization is in the best position to make them, based on his or her knowledge of the organization's future direction.

EXHIBIT A

SELECTED OCCUPATIONS: PUBLIC ADMINISTRATION, SIC 909, 931, 951

MANAGERIAL, ADMINISTRATIVE & RELATED

**Government Administrators** (Executive to Senior Middle Managers)
**Government Inspectors & Regulatory Officers** (Supervisors & Inspectors such as health, safety & other regulations; excludes building inspectors which are in Natural Science, Engineering & Related, depending on skill level)
**Financial Officers** (e.g., Accountants, Auditors, Financial Analysts)
**Personnel & Related Officers** (includes Manpower Counsellors-government, Personnel Administrators)
**All Other Managers & Administrators** (Includes all senior & middle management and administrative support functions such as purchasing & public relations officers not listed above)

NATURAL SCIENCE, ENGINEERING & MATHEMATICS

**Scientists**
**Engineers**
**Technicians/Technologists** (Sciences & Engineering)
**Draughtsmen**
**Systems Analysts & Computer Programmers**

CLERICAL

**All Clerical Supervisors**
**Secretaries**
**Typist/Clerk-Typist** (includes Word Processing Operators)
**Bookkeeping & Accounting Clerks**
**Statistical Clerks**
**EDP Equipment Operators**
**Library/File Clerks**
**General Office Clerks**
**All Other Clerks** (not listed above)



**The Study is Focusing on Selected Occupations**

The Task Force for your industry is focusing on chosen major occupational groups and selected occupations within these major groups. These are listed in Exhibit A. The job titles and definitions being used are from the "Canadian Classification and Dictionary of Occupations, 1971" (CCDO). The CCDO is a universal system of job titles and descriptions. Our consultants are available to assist you or your staff in clarifying which of your organization's positions should be considered in the CCDO titles listed in Exhibit A.

**Please Call If You Have Any Enquiries**

Should you or your staff require any assistance, please call Sandra Skivsky of our firm or the consultant who will be interviewing you, at 366-1921.

**Your Participation is Appreciated**

While we appreciate that your participation in the survey puts a demand on your time and organization, we would emphasize that your contribution will have an important impact on the results of this project.

SIC 909

PARTICIPANT INFORMATION

ORGANIZATION NAME: _____
UNION NAME (If appropriate): _____
AFFILIATED ORGANIZATIONS: _____
MAIN ADDRESS: _____
TELEPHONE NUMBER: (  ) _____

BRIEF DESCRIPTION OF OPERATION IN ONTARIO

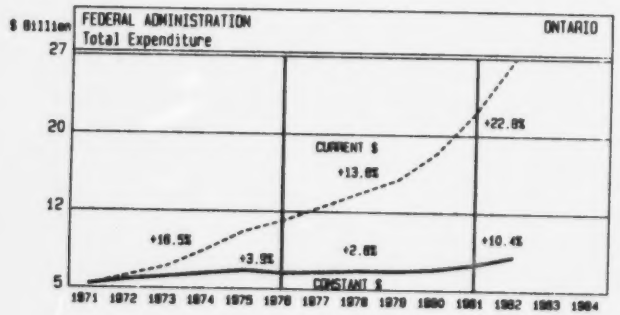
| Divisions/Branches/Affiliates | Products/Services |
|---|---|
| | |
| | |
| | |
| | |

SURVEY PARTICIPANTS

| Names | Position | Number of Years With Employer | Number of Years With Industry | Check (✓) Sections Answered II | III | IV | V | VI | VII |
|---|---|---|---|---|---|---|---|---|---|
| (principal respondent) | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| (other respondents) | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | | | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

CHART 1

FEDERAL ADMINISTRATION EXPENDITURES IN ONTARIO*




* Source: Estimated from Statistics Canada, Provincial Economic Accounts, Cat. No. 13-213. (Current expenditure excluding transfers to provincial and local governments, plus gross capital formation).

SIC 909



1. FEDERAL GOVERNMENT ADMINISTRATION: TOTAL EXPENDITURE IN ONTARIO

Chart 1, opposite, illustrates total expenditures for Federal Government Administration in **ONTARIO** in current dollars (dotted line) and in constant dollars (current dollars adjusted for price changes, solid line).

The rates shown for the first three time periods listed below are expressed in annual compound rates of change (in constant dollars).

Using these rates as a guide, please **estimate** the annual compound rates of change (in constant dollars) in **total expenditure** in ONTARIO for Federal Government Administration for the next five periods listed.

| Total Expenditure in Ontario | Annual Compound Rate of Change (in constant dollars) |
|---|---|
| 1971 to 1976 | +3.9 % |
| 1976 to 1981 | +2.8 % |
| 1981 to 1982 | +10.4 % |
| | Your Estimates (Indicate if + or -) |
| 1982 to 1983? | ___ % |
| 1983 to 1984? | ___ % |
| 1984 to 1985? | ___ % |
| 1985 to 1990? | ___ % |
| 1990 to 1995? | ___ % |

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2. FEDERAL GOVERNMENT ADMINISTRATION: EMPLOYMENT IN ONTARIO

The table below indicates total employment and annual compound rates of change for Federal Government Administration in ONTARIO between 1974 and 1983. (Statistics Canada, Federal Government Employment, Cat. No. 72-004).

Would you please indicate your estimates for the four following periods listed below (i.e., 1984-1995) for ONTARIO. Provide your estimates in actual numbers or in annual compound rates of change, whichever is easier.

For your information, total employment covers full-time, part-time, temporary, casual and contract - i.e., total "head count".

| Total Employment in Ontario | | Annual Compound Rates of Change | |
|---|---|---|---|
| 1974 | 175,598 | | |
| 1981 | 168,227 | 1974-1981 | -0.6 % |
| 1982 | 173,734 | 1981-1982 | +3.3 % |
| 1983 | 173,409 | 1982-1983 | -0.2 % |

| Your Estimates | | | | (Indicate if + or -) |
|---|---|---|---|---|
| 1984? | _____ | OR | 1983-1984? | ___ % |
| 1985? | _____ | OR | 1984-1985? | ___ % |
| 1990? | _____ | OR | 1985-1990? | ___ % |
| 1995? | _____ | OR | 1990-1995? | ___ % |

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## 3. ORGANIZATION'S ADOPTION OF TECHNOLOGIES

The following questions refer to new technologies your organization has already or may adopt over the next ten years in ONTARIO.

3a. Please indicate the technologies that have already been adopted by your organization. Record your answer on Chart 3, opposite, under column 3a.

3b. Please indicate the technologies that will probably be adopted by your organization between 1985 and 1990. Record your answer on Chart 3, under column 3b. It may be appropriate to check more than one time period.

3c. Please indicate the technologies that will probably be adopted by your organization between 1990 and 1995. Record your answer on Chart 3, under column 3c. It may be appropriate to check more than one time period.

CHART 3

TECHNOLOGIES ADOPTED OR TO BE ADOPTED BY YOUR ORGANIZATION

| | 3a ADOPTED IN 1984 OR BEFORE | 3b WILL BE ADOPTED BETWEEN 1985-1990? | 3c WILL BE ADOPTED BETWEEN 1990-1995? |
|---|---|---|---|
| **1. SERVICE DELIVERY TECHNOLOGIES** | | | |
| On-Line Client Data Bases | ☐ | ☐ | ☐ |
| Direct Data Entry from Field | ☐ | ☐ | ☐ |
| Electronic Processing of Service Requests (e.g., test claim validity) | ☐ | ☐ | ☐ |
| Electronic Service Delivery | ☐ | ☐ | ☐ |
| Any Others? _____ | ☐ | ☐ | ☐ |
| _____ | ☐ | ☐ | ☐ |
| **2. DESIGN TECHNOLOGIES** | | | |
| Computer-Aided Design (CAD) | ☐ | ☐ | ☐ |
| Computer-Aided Engineering (CAE) | ☐ | ☐ | ☐ |
| Computer-Aided Mapping | ☐ | ☐ | ☐ |
| Computer-Aided Project Management | ☐ | ☐ | ☐ |
| Any Others? _____ | ☐ | ☐ | ☐ |
| _____ | ☐ | ☐ | ☐ |
| **3. OFFICE AUTOMATION TECHNOLOGIES** | | | |
| Mainframe/Mini-computers | ☐ | ☐ | ☐ |
| Word Processing | ☐ | ☐ | ☐ |
| Microcomputers | ☐ | ☐ | ☐ |
| Data Base Services (External) | ☐ | ☐ | ☐ |
| Electronic Filing | ☐ | ☐ | ☐ |
| Internal Data Base Management Systems | ☐ | ☐ | ☐ |
| Local Area Networks (LAN) | ☐ | ☐ | ☐ |
| 4th Generation Computer Languages | ☐ | ☐ | ☐ |
| Computerized Decision Support Systems | ☐ | ☐ | ☐ |
| Voice Activated Computers | ☐ | ☐ | ☐ |
| Artificial Intelligence/Expert Systems | ☐ | ☐ | ☐ |
| Fully Integrated Work Stations | ☐ | ☐ | ☐ |
| Any Others? _____ | ☐ | ☐ | ☐ |
| _____ | ☐ | ☐ | ☐ |
| **5. TELECOMMUNICATIONS TECHNOLOGIES** | | | |
| Private Automatic Branch Exchange (PABX) | ☐ | ☐ | ☐ |
| Electronic Mail | ☐ | ☐ | ☐ |
| Voice Mail | ☐ | ☐ | ☐ |
| Facsimile with Built-in Microprocessor (FAX) | ☐ | ☐ | ☐ |
| Satellite/Microwave Systems | ☐ | ☐ | ☐ |
| Videotex | ☐ | ☐ | ☐ |
| Video Conferencing | ☐ | ☐ | ☐ |
| Fibre Optics | ☐ | ☐ | ☐ |
| Any Others? _____ | ☐ | ☐ | ☐ |
| _____ | ☐ | ☐ | ☐ |
| **6. OTHER TECHNOLOGIES** | | | |
| Computerized Inventory Control | ☐ | ☐ | ☐ |
| _____ | ☐ | ☐ | ☐ |
| _____ | ☐ | ☐ | ☐ |
| HAVE/WILL NOT ADOPT ANY NEW TECHNOLOGIES IN THIS PERIOD | ☐ | ☐ | ☐ |



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4. FORCES DRIVING THE ORGANIZATION'S NEED FOR NEW TECHNOLOGIES OVER THE NEXT 10 YEARS

4a. What is the **single most important driving factor** in your organization's internal or external environment which could accelerate your organization's **need to adopt** these new technologies over the next 10 years in ONTARIO?

4b. What is the **second most important factor** likely to accelerate your organization's need to adopt these new technologies?

4c. And what is the **third most important** factor?





5. FACTORS AFFECTING THE ORGANIZATION'S RATE OF TECHNOLOGY ADOPTION OVER THE NEXT 10 YEARS

5a. What is the **single most important factor** in your organization's internal or external environment that could slow down the speed at which your organization will adopt these new technologies over the next 10 years in ONTARIO?

5b. What is the **second most important** factor that could slow down your organization's adoption of these new technologies?

5c. And what is the **third most important factor**?

## 6. IMPACT OF TECHNOLOGY ON OCCUPATIONS OVER THE NEXT 10 YEARS

The following questions attempt to determine impacts on specific occupations you expect to be caused by the adoption of new technologies in your organization over the next 10 years in ONTARIO.

6a. Please indicate the **occupations** in which your organization is likely to have an **oversupply of people** over the next 10 years as a result of the adoption of these new technologies. Record your answer on Chart 6, opposite, under column 6a.

6b. Please indicate the **occupations** in which you expect your organization will have a **shortage of the skills** required to cope with these new technologies. Record your answer on Chart 6, under column 6b.

CHART 6

IMPACT OF TECHNOLOGIES ON SELECTED OCCUPATIONS IN YOUR ORGANIZATION OVER THE NEXT 10 YEARS

| | 6a OCCUPATIONS WITH AN OVERSUPPLY OF SKILLS | 6b OCCUPATIONS WITH A SHORTAGE OF THE REQUIRED SKILLS |
|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE & RELATED** | | |
| • Government Administrators (Executive to Senior Middle Managers) | ☐ | ☐ |
| • Government Inspectors & Regulatory Officers (Supervisors & Inspectors) | ☐ | ☐ |
| • Financial Officers (e.g., Accountants, Auditors, Financial Analysts). | ☐ | ☐ |
| • Personnel & Related Officers (includes Manpower Counsellors government) | ☐ | ☐ |
| • All Other Managers & Administrators (not listed above) | ☐ | ☐ |
| **NATURAL SCIENCE, ENGINEERING & MATHEMATICS** | | |
| • Scientists | ☐ | ☐ |
| • Engineers | ☐ | ☐ |
| • Technicians/Technologist (Sciences & Engineering) | ☐ | ☐ |
| • Draughtsmen | ☐ | ☐ |
| • Systems Analysts & Computer Programmers | ☐ | ☐ |
| **CLERICAL** | | |
| • All Clerical Supervisors | ☐ | ☐ |
| • Secretaries | ☐ | ☐ |
| • Typists/Clerk Typists | ☐ | ☐ |
| • Bookkeeping & Accounting Clerks | ☐ | ☐ |
| • Statistical Clerks | ☐ | ☐ |
| • EDP Equipment Operators | ☐ | ☐ |
| • Library/File Clerks | ☐ | ☐ |
| • General Office Clerks | ☐ | ☐ |
| • All Other Clerks (not listed above) | ☐ | ☐ |
| ANY OTHER OCCUPATIONS SIGNIFICANTLY AFFECTED? WHICH ONES? | | |
| _____ | ☐ | ☐ |
| _____ | ☐ | ☐ |
| _____ | ☐ | ☐ |

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7. ACTIONS TO DEAL WITH OVERSUPPLY OF SKILLS IN YOUR ORGANIZATION OVER NEXT 10 YEARS

The following questions relate to the actions your organization will likely take to deal with the oversupply of people in your organization resulting from the adoption of these new technologies in ONTARIO.

7a. For each occupation with a potential oversupply of skills (as you indicated in Q.6a), please identify the steps your organization will likely take that will affect the largest number of people in that occupation. Record your answers on Chart 7, opposite, under column 7a.

In answering this and the following question, please consider the possible actions listed below as well as any other possible action not in the list but that your organization is likely to take.

Possible Actions

- Attrition
- Early Retirement
- Layoffs
- Relocation (geographic)
- Shorter hours/work week
- Job sharing
- Change from full-time to part-time
- Retraining
- Lateral transfer
- Upgrading
- Downgrading
- Etc., etc.

7b. Again, for each of these occupations, identify the step your organization may take that will affect the second largest number of people in that occupation. Record on Chart 7, under column 7b.



CHART 7

STEPS YOUR ORGANIZATION WILL LIKELY TAKE TO DEAL WITH OVERSUPPLY OF SKILLS OVER NEXT 10 YEARS

| OCCUPATIONS | 7a STEPS THAT WILL AFFECT THE LARGEST NUMBER OF PEOPLE IN THIS OCCUPATION | 7b STEPS THAT WILL AFFECT THE 2ND LARGEST NUMBER OF PEOPLE IN THIS OCCUPATION |
|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE & RELATED** | | |
| • Government Administrators (Executive to Senior Middle Managers) | | |
| • Government Inspectors & Regulatory Officers (Supervisors & Inspectors) | | |
| • Financial Officers (e.g., Accountants Auditors, Financial Analysts) | | |
| • Personnel & Related Officers (includes Manpower Counsellors government) | | |
| • All Other Managers & Administrators (not listed above) | | |
| **NATURAL SCIENCE, ENGINEERING & MATHEMATICS** | | |
| • Scientists | | |
| • Engineers | | |
| • Technicians/Technologist (Sciences & Engineering) | | |
| • Draughtsmen | | |
| • Systems Analysts & Computer Programmers | | |
| **CLERICAL** | | |
| • All Clerical Supervisors | | |
| • Secretaries | | |
| • Typists/Clerk Typists | | |
| • Bookkeeping & Accounting Clerks | | |
| • Statistical Clerks | | |
| • EDP Equipment Operators | | |
| • Library/File Clerks | | |
| • General Office Clerks | | |
| • All Other Clerks (not listed above) | | |
| ANY OTHER OCCUPATIONS SIGNIFICANTLY AFFECTED? WHICH ONES? | | |
| _____ | | |
| _____ | | |
| _____ | | |

## 8. STEPS TO ACQUIRE THE NEW SKILL REQUIREMENTS OVER THE NEXT 10 YEARS

The following questions are intended to identify the most likely steps your organization may take to acquire the new skill requirements associated with the new technologies over the next 10 years in ONTARIO.

8a. Please indicate, for each occupation with a potential shortage of the new skill requirements (as you indicated in Q6b), the step your organization will likely take that will affect the largest number of people in that occupation. Record your answers on Chart 8, column 8a.

Please consider the possible actions listed below as well as any other action (not listed) that your organization is likely to take.

Likely Steps

- Retraining
- Relocation
- Upgrading
- Increased overtime of organization's skill people
- Recruiting full-time skilled people
- Recruiting part-time skilled people
- Contracting work out
- Etc., etc.

8b. Please indicate, for each occupation, the step your organization may take that will affect the second largest number of people in that occupation. Record your answers in column 8b.

CHART 8

STEPS YOUR ORGANIZATION WILL TAKE OVER NEXT 10 YEARS TO ACQUIRE THE NEW SKILL REQUIREMENTS

| OCCUPATIONS | 8a STEP WHICH WILL AFFECT THE LARGEST NUMBER OF PEOPLE IN THIS OCCUPATION | 8b STEP WHICH WILL AFFECT THE 2ND LARGEST NUMBER OF PEOPLE IN THIS OCCUPATION |
|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE & RELATED** | | |
| • Government Administrators (Executive Senior Middle Managers) | | |
| • Government Inspectors & Regulatory Officers (Supervisors & Inspectors) | | |
| • Financial Officers (e.g., Accountants Auditors, Financial Analysts) | | |
| • Personnel & Related Officers (includes Manpower Counsellors government) | | |
| • All Other Managers & Administrators (not listed above) | | |
| **NATURAL SCIENCE, ENGINEERING & MATHEMATICS** | | |
| • Scientists | | |
| • Engineers | | |
| • Technicians/Technologist (Sciences & Engineering) | | |
| • Draughtsmen | | |
| • Systems Analysts & Computer Programmers | | |
| **CLERICAL** | | |
| • All Clerical Supervisors | | |
| • Secretaries | | |
| • Typists/Clerk Typists | | |
| • Bookkeeping & Accounting Clerks | | |
| • Statistical Clerks | | |
| • EDP Equipment Operators | | |
| • Library/File Clerks | | |
| • General Office Clerks | | |
| • All Other Clerks (not listed above) | | |
| ANY OTHER OCCUPATIONS SIGNIFICANTLY AFFECTED? WHICH ONES? | | |
| | | |
| | | |
| | | |

## 9. NATURE OF IMPACT ON SKILLS AND JOB CONTENT OVER THE NEXT TEN YEARS

The following questions are meant to identify the nature of the impact on selected occupations in ONTARIO.

9a. For selected occupations in your organization, please indicate how the new technologies will affect each in their daily work. That is, will their daily work require greater skill (+), less skill (-), or about the same skill (0) as they currently require. Record your answers on Chart 9, opposite, under Column 9a.

9b. Please indicate whether the new skills they require will demand more time (+), less time (-), or about the same time (0) to achieve the proficiency that they will need. Record your answers on Chart 9, column 9b.

9c. Please indicate whether, in using these new technologies, these occupations will require more knowledge (+) of the organization's operations, less knowledge (-), or about the same (0) amount of knowledge as is currently required to perform their daily tasks. Record your answers on Chart 9, under 9c.

CHART 9

IMPACT OF TECHNOLOGY ON SKILL LEVELS AND JOB CONTENT

| | 9a SKILLS REQUIRED (+, -, 0) | 9b TIME TO ACHIEVE PROFICIENCY (+, -, 0) | 9c KNOWLEDGE OF COMPANY'S OPERATIONS (+, -, 0) | COMMENTS |
|---|---|---|---|---|
| **MANAGERIAL, ADMINISTRATIVE, & RELATED** | | | | |
| • Government Administrators (Executive to Senior Middle Managers) | | | | |
| • Government Inspectors & Regulatory Officers (Supervisors & Inspectors) | | | | |
| • Financial Officers (e.g., Accountants, Auditors, Financial Analysts) | | | | |
| • Personnel & Related Officers (includes Manpower Counsellors government) | | | | |
| • All Other Managers & Administrators (not listed above) | | | | |
| **NATURAL SCIENCE, ENGINEERING & MATHEMATICS** | | | | |
| • Scientists | | | | |
| • Engineers | | | | |
| • Technicians/Technologist (Sciences & Engineering) | | | | |
| • Draughtsmen | | | | |
| • Systems Analysts & Computer Programmers | | | | |
| **CLERICAL OCCUPATIONS** | | | | |
| • All Clerical Supervisors | | | | |
| • Secretaries | | | | |
| • Typists/Clerk Typists | | | | |
| • Bookkeeping & Accounting Clerks | | | | |
| • Statistical Clerks | | | | |
| • EDP Equipment Operators | | | | |
| • Library/File Clerks | | | | |
| • General Office Clerks | | | | |
| • All Other Clerks (not listed above) | | | | |
| ANY OTHER OCCUPATIONS SIGNIFICANTLY AFFECTED WHICH USES: | | | | |
| _____ | | | | |
| _____ | | | | |
| _____ _____ | | | | |

10. TRAINING/RETRAINING

These questions are about the current and future importance of **training and retraining** in your organization.

10a. Please indicate what were your organization's total training costs as a percent of total labour costs in 1981. Record your answer on Chart 10, line 10a.

Training costs include the costs of internally or externally provided training programs, classroom and on-the-job workshops, vouchers or tuition credits, provided by your organization, which are intended to train employees to perform their jobs or to retrain employees to assume new or alternate jobs. Labour costs include all wages, salaries and benefits. (e.g., $\frac{\text{Total Training Costs}}{\text{Total Labour Costs}} \times 100 = 1.0\%$)

10b. Please indicate what your organization's total training costs as a percent of total labour costs will be in 1984 (to year end). Record your answer on line 10b.

10c. What do you estimate for 1985, (line 10c)?

10d. What do you estimate it will be in 1990, (line 10d)?

10e. What do you estimate it will be in 1995, (line 10e)?

10f. For each year on Chart 10, (line 10a to 10e), please indicate what percent of total training costs in each year have or will go towards training people to adapt to the new technologies.

CHART 10

TRAINING COSTS OF YOUR ORGANIZATION

| | | | As a Percent of Total Labour Costs | Percent of Total Training Costs Directly Related to New Technologies |
|---|---|---|---|---|
| 10a. | 1981? | Actual | ___% | ___% |
| 10b. | 1984? | Estimate | ___% | ___% |
| 10c. | 1985? | Estimate | ___% | ___% |
| 10d. | 1990? | Estimate | ___% | ___% |
| 10e. | 1995? | Estimate | ___% | ___% |



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## 11. ORGANIZATION'S EMPLOYMENT TRENDS

In this section, we would like to determine how the organization's employment levels in ONTARIO are likely to change over the next 10 years.

11a. To begin, considering all possible factors in your organization's internal and external environment, what is the single most important factor which will have an impact on your organization's level of employment in ONTARIO over the next 10 years? _____

_____

11b. The second most important factor? _____

_____

11c. The third most important factor? _____

_____

11d. Please indicate total employees (includes full-time, temporary, contract, casual, seasonal and part-time employment) in your organization in ONTARIO for 1971, 1981 and 1984 from your employment records. Record your answers on Chart 11, column 11d.

Please estimate future total employment in your organization in ONTARIO for 1985, 1990 and 1995.

11e. Please indicate the percent of your total employment in ONTARIO that are part-time employees (i.e., less than normal full work week), for 1981 and 1984. Record your answers on Chart 11, column 11e.

Also in column 11e, please estimate part-time employees as a percent of total employees in ONTARIO for 1985, 1990 and 1995.





11f. Please translate your total ONTARIO employment (include full-time, part-time, casual, temporary, seasonal) into a full-time equivalent (F.T.E.) figure for your organization for 1981 and 1984 in column 11f.

Also in column 11f, please estimate total employment in terms of a full-time equivalent (F.T.E.) for 1985, 1990 and 1995.

By F.T.E. we mean a normal, full, work week for a normal, full year. F.T.E. can be measured in a variety of ways depending on whatever is normal for your organization or industry. For example, if expressed in hours of work per year one FTE might range from 1750 to 2000 hours of work a year depending on the length of the normal work week (e.g., 35 hours/week x 50 weeks = 1750 hours, 40 hours/week x 50 weeks = 2000 hours.)

CHART 11

ORGANIZATION'S EMPLOYMENT TRENDS IN ONTARIO

| | 11d TOTAL EMPLOYMENT IN ONTARIO | 11e PART-TIME EMPLOYEES AS A % OF TOTAL EMPLOYMENT | 11f TOTAL EMPLOYMENT IN FULL-TIME EQUIVALENT (F.T.E.) |
|---|---|---|---|
| Actual Figures | | | |
| 1971? | _____ | | |
| 1981? | _____ | _____ % | _____ FTE |
| 1984? | _____ | _____ % | _____ FTE |
| Your Estimates | | | |
| 1985? | _____ | _____ % | _____ FTE |
| 1990? | _____ | _____ % | _____ FTE |
| 1995? | _____ | _____ % | _____ FTE |

## 12. CHANGES IN EMPLOYMENT STRUCTURE

This section is intended to measure the changes in the employment structure of your organization in ONTARIO between 1981 and 1995.

12a. Please indicate the actual percentage share of <u>each</u> occupation listed as a percent of your organization's total employment in ONTARIO in 1981. Record your answer on Chart 12, column 12a.

12b. Please indicate the actual percentage share of <u>each</u> selected occupation listed as a percent of your organization's total employment in ONTARIO in 1984. Record your answer in column 12b.

12c. Please estimate the same for each selected occupation in 1985. Record in column 12c.

12d. Please estimate the same for each selected occupation in 1990. Record in column 12d.

12e. Please estimate the same for each selected occupation in 1995. Record in column 12e.

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CHART 12

TRENDS IN YOUR ORGANIZATION'S OCCUPATIONAL STRUCTURE BETWEEN 1981 AND 1995

| | OCCUPATIONS AS A PERCENT OF TOTAL EMPLOYMENT OF THE FIRM IN ONTARIO | | | | | |
|---|---|---|---|---|---|---|
| | 12a Actual 1981 | 12b Actual 1984 | 12c Estimate 1985 | 12d Estimate 1990 | 12e Estimate 1995 | |
| | % | % | % | % | % | |
| MANAGERIAL, ADMINISTRATIVE, & RELATED | ☐ | ☐ | ☐ | ☐ | ☐ | 1a |
| • Government Administrators (Executive to Senior Middle Managers) | | | | | | |
| • Government Inspector & Regulatory Officers (Supervisors & Inspectors) | ___ | ___ | ___ | ___ | ___ | |
| • Financial Officers (e.g., Accountants, Auditors, Financial Analysts) | ___ | ___ | ___ | ___ | ___ | |
| • Personnel & Related Officers (includes Manpower Counsellors government, Personnel Administrators) | ___ | ___ | ___ | ___ | ___ | |
| • All Other Managers & Administrators (not listed above) | ___ | ___ | ___ | ___ | ___ | |
| NATURAL SCIENCE, ENGINEERING & MATHEMATICS | ☐ | ☐ | ☐ | ☐ | ☐ | 2a |
| • Scientists | ___ | ___ | ___ | ___ | ___ | |
| • Engineers | ___ | ___ | ___ | ___ | ___ | |
| • Technicians/Technologist (Sciences & Engineering) | ___ | ___ | ___ | ___ | ___ | |
| • Draughtsmen | ___ | ___ | ___ | ___ | ___ | |
| • Systems Analysts & Computer Programmers | ___ | ___ | ___ | ___ | ___ | |
| • All Other Natural Science, Engineering & Mathematics (not listed above e.g. Architects, Surveyors) | ___ | ___ | ___ | ___ | ___ | |
| CLERICAL | ☐ | ☐ | ☐ | ☐ | ☐ | 3a |
| • All Clerical Supervisors | ___ | ___ | ___ | ___ | ___ | |
| • Secretaries | ___ | ___ | ___ | ___ | ___ | |
| • Typists/Clerk Typists | ___ | ___ | ___ | ___ | ___ | |
| • Bookkeeping & Accounting Clerks | ___ | ___ | ___ | ___ | ___ | |
| • Statistical Clerks | ___ | ___ | ___ | ___ | ___ | |
| • EDP Equipment Operators | ___ | ___ | ___ | ___ | ___ | |
| • Library/File Clerks | ___ | ___ | ___ | ___ | ___ | |
| • General Office Clerks | ___ | ___ | ___ | ___ | ___ | |
| • All Other Clerks (not listed above) | ___ | ___ | ___ | ___ | ___ | |
| ALL OTHER OCCUPATIONS | ☐ | ☐ | ☐ | ☐ | ☐ | 5a |
| • ORGANIZATION'S TOTAL EMPLOYMENT IN ONTARIO (1+2+3+4+5) = 100% | 100% | 100% | 100% | 100% | 100% | |

## 13. EMPLOYMENT STRUCTURE BY SEX

The following questions refer to your organization's employment in ONTARIO by sex for each specific occupation listed in Chart 13.

13a. Please provide the percentage split between male and female of your employees in ONTARIO by each occupation in 1981. Record your answer on Chart 13, column 13a.

13b. Please provide the percentage split between male and female employees by occupation in ONTARIO in 1984. Record your answer in Column 13b.

CHART 13

EMPLOYMENT STRUCTURE BY SEX AND OCCUPATION IN ONTARIO

| | 13a 1981 EMPLOYMENT MALE | FEMALE | TOTAL | 13b 1984 EMPLOYMENT MALE | FEMALE | TOTAL |
|---|---|---|---|---|---|---|
| MANAGERIAL, ADMINISTRATIVE & RELATED | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Government Administrators (Executive to Senior Middle Managers) | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Government Inspectors & Officers (Supervisors & Inspectors) | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Financial Officers | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Personnel & Related Officers (includes Manpower Counsellors government, Personnel Administrators) | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • All Other Managers & Administrators (not listed above) | ___% + | ___% | =100% | ___% + | ___% | =100% |
| NATURAL SCIENCE, ENGINEERING & MATHEMATICS | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Scientists | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Engineers | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Technicians/Technologist (Sciences & Engineering) | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Draughtsmen | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Systems Analysts & Computer Programmers | ___% + | ___% | =100% | ___% + | ___% | =100% |
| CLERICAL | | | | | | |
| • All Clerical Supervisors | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Secretaries | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Typists/Clerk Typists | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Bookkeeping & Accounting Clerks | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Statistical Clerks | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • EDP Equipment Operators | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • Library/File Clerks | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • General Office Clerks | ___% + | ___% | =100% | ___% + | ___% | =100% |
| • All Other Clerks (not listed above) | ___% + | ___% | =100% | ___% + | ___% | =100% |
| ORGANIZATION'S TOTAL EMPLOYEES IN ONTARIO | ___% + | ___% | =100% | ___% + | ___% | =100% |

14. ORGANIZED LABOUR IN YOUR ORGANIZATION IN ONTARIO

14a. Does your organization have any workers in ONTARIO covered by a collective labour agreement(s)?

Yes ☐ No ☐ If no, go on to Question 14c.

14b. If yes, what percent of your organization's total employment in ONTARIO is currently (1984) unionized?

____%

14c. What percent of your organization's total employment in ONTARIO do you estimate will be unionized by 1985, 1990 and by 1995?

- 1985? ____%
- 1990? ____%
- 1995? ____%

14d. If you expect an increase in the percent of total employment that will be unionized, please indicate the specific occupational groups within which you expect the increase will take place.

_____

_____





15. ORGANIZED LABOUR AND TECHNOLOGY CHANGE

If any of the employees in your organization in ONTARIO are represented by a union, please answer the following series of questions. If none of the workers in your organization in ONTARIO are unionized, please go on to Question 16, p. 22.

15a. Please indicate the name of the union(s) in your organization in ONTARIO. Record your answers on Chart 15, on line 15a.

15b. On line 15b, please indicate the number of the organization's employees in ONTARIO in each union.

15c. On line 15c, indicate the worker groups in your organization the union(s) represents.

15d. On line 15d, check ☑ if the contract(s) has a technology change clause(s).

15e. On line 15e, check ☑ if the technology change clause(s) covers any of the following:

- Notice/Disclosure
- Consultation/Participation
- Joint Technology Change Committee
- Job Security
- Seniority
- Other (please specify).

15f. On line 15f, indicate whether the clause(s) is effectively administered? If your answer is "NO", please explain your answer.

CHART 15

ORGANIZED LABOUR IN ONTARIO

| | (name of union) | (name of union) | (name of union) |
|---|---|---|---|
| 15a. Name of Unions in Organization | | | |
| 15b. Number of Organization's Employees in Each Union | | | |
| 15c. Worker Groups Represented by Each Union | | | |
| | | | |
| 15d. Does Union(s) Contract(s) Have a Technology Change Clause(s)? | | | |
| YES | ☐ | ☐ | ☐ |
| NO | ☐ | ☐ | ☐ |
| 15e. Check ☑ if Technology Change Clause(s) Includes: | | | |
| • Notice/Disclosure | ☐ | ☐ | ☐ |
| • Consultation/Participation | ☐ | ☐ | ☐ |
| • Joint Technology Change Committee | ☐ | ☐ | ☐ |
| • Job Security | ☐ | ☐ | ☐ |
| • Seniority | ☐ | ☐ | ☐ |
| • Other _____ (specify) | ☐ | ☐ | ☐ |
| 15f. Is the Clause Effectively Administered? | | | |
| YES | ☐ | ☐ | ☐ |
| NO | ☐ | ☐ | ☐ |
| If 'NO', explain | | | |
| | | | |

15g. In general, what has been the union's position on the adoption of new technologies in your organization? Please explain.

_____

_____

_____

_____

_____



SIC 909

16. THE NATURE OF WORKER INVOLVEMENT IN THE PROCESS OF TECHNOLOGY ADOPTION

The following questions are on the nature of the **relationship between workers and management** in your organization as decisions are made on the adoption of new technology.

16a. Does your organization have a formal mechanism for worker participation in any of the following? Please Check ☑ Yes or No.

| | YES | NO |
|---|---|---|
| • Setting production and/or sales targets: | | |
| - at company level? | ☐ | ☐ |
| - at division/plant level? | ☐ | ☐ |
| - at department/area level? | ☐ | ☐ |
| - at working group level? | ☐ | ☐ |
| • Improving productivity/quality? | ☐ | ☐ |
| • Adoption of new technology? | ☐ | ☐ |

16b. In your opinion, to what extent and how should management involve workers in decisions regarding the adoption of new technologies? Please comment.

_____

_____

_____

_____

_____

_____

## 17. FUTURE CAPITAL INVESTMENTS

17a. Please indicate how much, in today's dollars, your organization plans to spend on construction of structures and buildings in ONTARIO over the period 1985 to 1990 and over the period 1991 to 1995. Record your answer on Chart 17, column 17a.

17b. What percent of this spending can be directly attributed to the adoption of new technologies? Record under column 17b.

17c. Would you indicate how much, in today's dollars, your organization plans to spend on machinery and equipment over the period 1985 to 1990 and over the period 1991 to 1995 in ONTARIO. Record under column 17c.

17d. What percent of this spending on machinery and equipment will be for new technologies? Record under column 17d.

17e. Please indicate what criterion your organization will likely use to justify the financial investment in the new technologies.

Pay-back period ☐ _____

Return on investment ☐ If Yes, how long? _____

Other _____ ☐ If Yes, what rate? _____

(specify) Please elaborate

17f. Considering now your total capital investment in new technology over the next 10 years, what percent will be funded through internal funds and what percent will be funded through external funds?

Internal funds ___%

External funds ___%

100%

SIC 909

CHART 17

CAPITAL INVESTMENT PLANS

IN ONTARIO

| | INVESTMENT IN STRUCTURES & BUILDINGS | | INVESTMENT IN MACHINERY & EQUIPMENT | |
|---|---|---|---|---|
| | 17a | 17b | 17c | 17d |
| | IN TODAY'S DOLLARS (In Thousands $) | % DIRECTLY RELATED TO NEW TECHNOLOGY | IN TODAY'S DOLLARS (In Thousands $) | % FOR NEW TECHNOLOGY |
| 1985 to 1990? | $_____ | _____% | $_____ | _____% |
| 1991 to 1995? | $_____ | _____% | $_____ | _____% |

SIC 909

18. PLANNING FOR CHANGES IN TECHNOLOGY

These questions ask about your organization's plans for adopting new technologies in ONTARIO.

18a. Does your organization currently have a long-term strategic plan?

Yes ☐ No ☐

18b. Does your organization have a plan to deal with future human resource needs?

Yes ☐ No ☐ If no, go to Question 18d.

18c. Up to what year has your organization planned for its human resource needs?

_____

(WRITE IN YEAR)

18d. Does your organization have a capital investment plan dealing with the adoption of new technologies?

Yes ☐ No ☐ If no, go to Question 19. on p. 25.

18e. Up to what year has your organization planned for its capital requirements?

_____

(WRITE IN YEAR)

18f. On a scale of 1 to 5, please indicate to what extent these two plans (capital investment and human resource plans) are integrated.

(Please circle answer)

NOT AT ALL INTEGRATED 1 2 3 4 5 HIGHLY INTEGRATED





19. Please indicate below any other comments on the issue of employment and new technology you wish to make.

_____

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR PARTICIPATION

## FEDERAL GOVERNMENT

### Number of Organigations and Unions Responding by Question

| Question | | Organizations | Unions | Question | | Organizations | Unions |
|---|---|---|---|---|---|---|---|
| Question 1 | 1982-1983 | 5 | 1 | Question 12 | a,b,c,d,e | 8 | 2 |
| | 1983-1984 | 5 | 1 | | | | |
| | 1984-1985 | 5 | 1 | | | | |
| | 1985-1990 | 6 | 1 | Question 13 | | * | * |
| | 1990-1995 | 6 | 0 | | | | |
| Question 2 | | * | * | Question 14 | a | 8 | 2 |
| | | | | | b | 8 | 2 |
| | | | | | c | 8 | 2 |
| Question 3 | a,b,c | 8 | 2 | | d | 0 | 0 |
| Question 4 | a,b,c | 8 | 2 | Question 15 | a | 8 | 1 |
| | | | | | b | 8 | 1 |
| | | | | | c | * | * |
| Question 5 | a,b,c | 8 | 2 | | d | 8 | 1 |
| | | | | | e | 8 | 1 |
| | | | | | f | 7 | 1 |
| Question 6 | a,b | 8 | 1 | | g | 7 | 1 |
| Question 7 | a | 7 | 1 | Question 16 | a | 7 | 2 |
| | b | 5 | 1 | | b | 8 | 2 |
| Question 8 | a | 8 | 1 | Question 17 | a | 6 | 0 |
| | b | 5 | 1 | | b | 6 | 0 |
| | | | | | c | 7 | 0 |
| | | | | | d | 6 | 0 |
| Question 9 | a | 8 | 2 | | e | 6 | 0 |
| | b | 8 | 2 | | f | 7 | 0 |
| | c | 8 | 2 | | | | |
| | | | | Question 18 | a | 8 | 1 |
| Question 10 | a,b,c,d,e | 8 | 2 | | b | 8 | 1 |
| | | | | | c | 6 | 0 |
| Question 11 | a,b,c, | 7 | 1 | | d | 8 | 1 |
| | d | 8 | 2 | | e | 5 | 1 |
| | e | 8 | 1 | | f | 5 | 1 |
| | f | 8 | 0 | | | | |

* Data not used and therefore, number of responses not reported.

## PROVINCIAL GOVERNMENT

### Number of Organigations and Unions Responding by Question

| Question | | Organizations |
|---|---|---|
| Question 1 | 1982-1983 | 2 |
| | 1983-1984 | 2 |
| | 1984-1985 | 2 |
| | 1985-1990 | 2 |
| | 1990-1995 | 2 |
| Question 2 | | * |
| Question 3 | a,b,c | 8 |
| Question 4 | a,b,c | 8 |
| Question 5 | a,b,c | 8 |
| Question 6 | a,b | 8 |
| Question 7 | a | 8 |
| | b | 8 |
| Question 8 | a | 8 |
| | b | 8 |
| Question 9 | a | 8 |
| | b | 8 |
| | c | 8 |
| Question 10 | a,b,c,d,e | 8 |
| Question 11 | a,b,c, | 8 |
| | d | 8 |
| | e | 7 |
| | f | 8 |

| Question | | Organizations |
|---|---|---|
| Question 12 | a,b,c,d,e | 8 |
| Question 13 | | * |
| Question 14 | a | 8 |
| | b | 8 |
| | c | 8 |
| | d | 1 |
| Question 15 | a | 8 |
| | b | 7 |
| | c | * |
| | d | 8 |
| | e | 8 |
| | f | 7 |
| | g | 6 |
| Question 16 | a | 8 |
| | b | 8 |
| Question 17 | a | 6 |
| | b | 6 |
| | c | 7 |
| | d | 7 |
| | e | 6 |
| | f | 7 |
| Question 18 | a | 7 |
| | b | 7 |
| | c | 4 |
| | d | 7 |
| | e | 2 |
| | f | 4 |

* Data not used and therefore, number of responses not reported.

## LOCAL GOVERNMENT

### Number of Organigations and Unions Responding by Question

| Question | | Organizations | Unions | Question | | Organizations | Unions |
|---|---|---|---|---|---|---|---|
| Question 1 | 1982-1983 | 10 | 2 | Question 12 | a,b,c,d,e | 10 | 7 |
| | 1983-1984 | 10 | 2 | | | | |
| | 1984-1985 | 10 | 2 | | | | |
| | 1985-1990 | 10 | 2 | Question 13 | | * | * |
| | 1990-1995 | 10 | 2 | | | | |
| Question 2 | | * | * | Question 14 | a | 10 | 7 |
| | | | | | b | 10 | 6 |
| | | | | | c | 10 | 5 |
| Question 3 | a,b,c | 10 | 3 | | d | 3 | 4 |
| Question 4 | a,b,c | 10 | 3 | Question 15 | a | 10 | 7 |
| | | | | | b | 10 | 5 |
| | | | | | c | * | * |
| Question 5 | a,b,c | 10 | 3 | | d | 10 | 7 |
| | | | | | e | 8 | 6 |
| | | | | | f | 7 | 4 |
| Question 6 | a,b | 10 | 2 | | g | 7 | 7 |
| Question 7 | a | 10 | 1 | Question 16 | a | 7 | 7 |
| | b | 9 | 1 | | b | 9 | 7 |
| Question 8 | a | 10 | 2 | Question 17 | a | 8 | 0 |
| | b | 10 | 1 | | b | 8 | 0 |
| | | | | | c | 8 | 0 |
| | | | | | d | 8 | 0 |
| Question 9 | a | 10 | 7 | | e | 7 | 0 |
| | b | 10 | 7 | | f | 7 | 0 |
| | c | 10 | 7 | | | | |
| | | | | Question 18 | a | 10 | 1 |
| Question 10 | a,b,c,d,e | 10 | 7 | | b | 10 | 1 |
| | | | | | c | 3 | 0 |
| Question 11 | a,b,c, | 9 | 0 | | d | 10 | 1 |
| | d | 9 | 0 | | e | 5 | 0 |
| | e | 9 | 0 | | f | 4 | 0 |
| | f | 10 | 0 | | | | |

* Data not used and therefore, number of responses not reported.

APPENDIX C

# RELIABILITY OF THE SAMPLE

## SAMPLE RELIABILITY

The sample reliability is summarized with other sample and population characteristics in "Table 1". The sample was selected as a three stage stratified random sample. The purpose of this stratification was to reduce the error variance in the measurement of organization size by increasing the homogeneity of each group of organizations within each strata.

The first stage consisted in creating two industry sectors (i.e. manufacturing and services). The second stage involved dividing up each industry sector into nine and fourteen industrial sub-classes respectively and according to Standard Industrial Classification codes (see Table 1). The third stage was to further stratify each SIC into three more homogeneous size groups:

| Manufacturing Sector | Service Sector |
|---|---|
| Small 20- 99 employees | 20-199 employees |
| Medium 100-499 employees | 200-999 employees |
| Large 500+ employees | 1,000+ employees |

Exceptions to these three size groupings are as follows:

| SECTOR | ORGANIZATION SIZE EXCLUSION |
|---|---|
| Manufacturing Sector | |
| 291 Iron & Steel Mills | less than 500 |
| 321 Aircraft & Aircraft Parts | less than 50 |
| Service Sector | |
| 701 Banks and Trusts | less than 50 |
| 721 General and Life Insurance | less than 50 |
| 735 Insurance Brokers | less than 50 |
| 909 Federal Government | less than 500 |
| 931 Provincial Government | less than 200 |
| 951 Local Government | less than 500 |

Overall, the sample yields a relatively high reliability level in reflecting the employment level of those sectors surveyed. For instance, for both the federal and provincial government sectors, the sample yields a minimum confidence level of about 90 percent with an associated allowable error of 11 percent. That is, we would expect that the estimated employment level for the sector has a 90 percent chance of being within $\pm$ 11 percent of the actual employment level found in the frame. Or stated alternatively, if 100 independent random samples were drawn, in 90 of these samples we would expect to have an estimated employment level within $\pm$ 11 percent of the actual employment level found in the sample frame.

Table 1 suggests a worse case scenario of 90 percent reliability with associated allowable error of 13 percent for local government. Though the total reported employment level within the sample reflects a very significant coverage of the employment level within this sector (i.e. 90 percent) the great variability in employment level within the sector contributes to a high level of variance in the employment level and thus reduced reliability and associated tolerance.

TABLE 1: SUMMARY - SELECTED SERVICE INDUSTRIES

SAMPLE FRAME AND SAMPLE

| SIC | SIC NAME | UNIVERSE | | SAMPLE FRAME | | | | SAMPLE | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of Firms | Number of Employees | Firm Size Cut Off | Number of Firms | Number of Employees | Share of Universe | Number of Firms | Number of Unions | Number of Employees | Reliability Level (min.) (Percent) | Allowable Error (Percent) |
| 701 | Chartered Banks | 68 | 64,200 | 50 | 16 | 60,300 | 94 | 8 | | 43,883 | 95 | 5 |
| 701 | Trust Companies | 41 | 20,000 | 50 | 22 | 19,000 | 95 | 6 | | 8,466 | 90 | 15 |
| 721 | Life Insurance | 45 | 31,200 | $10 MM | 26 | 28,200 | 90 | 6 | | 6,355 | 95 | 5 |
| 721 | General Insurance | 94 | 20,000 | $10 MM | 51 | 19,000 | 95 | 8 | | 2,128 | 95 | 9 |
| 735 | Insurance Brokers | 2,737 | 31,600 | 50 | 45 | 6,300 | 20 | 8 | | 1,213 | 90 | 11 |
| 909 | Federal Government | 67 | 91,000 | 500 | 22 | 69,000 | 76 | 8 | 2 | 28,350 | 90 | 11 |
| 931 | Provincial Government | 37 | 84,000 | 200 | 19 | 67,000 | 80 | 8 | | 37,599 | 90 | 11 |
| 951 | Local Government | 837 | 107,474 | 500 | 39 | 83,782 | 78 | 10 | 7 | 23,832 | 90 | 13 |
| 544 | Telephone Systems and Interconnects | 111 | 30,423 | 20 | 37 | 29,430 | 97 | 8 | 1 | 26,444 | 90 | 23 |
| 545 | Telegraph and Cable Systems | 4 | 2,543 | 20 | 4 | 2,543 | 100 | 3 | 1 | 2,116 | 90 | 20 |
| 631 | Food Stores | n.a. | 87,600 | 100 | 45 | 85,000 | 97 | | Expert Interviews Only | | | |
| 642 | General Merchandise Stores | n.a. | 92,000 | 100 | 12 | 76,000 | 83 | | Expert Interviews Only | | | |
| 853 | Computer Services | n.a. | 16,775 | 20 | 41 | 11,800 | 70 | 6 | | 291 | 90 | 17 |
| 867 | Management and Business Consultants | n.a. | 10,975 | 20 | 40 | 5,900 | 54 | 8 | | 1,070 | 95 | 6 |

APPENDIX D

## HISTORICAL TABLES


| | |
|---|---|
| FEDERAL GOVERNMENT | PAGE D.1 |
| PROVINCIAL GOVERNMENT | PAGE D.13 |
| LOCAL GOVERNMENT | PAGE D.24 |

## TABLE D1

## GOVERNMENT OUTLAYS IN ONTARIO BY LEVEL OF GOVERNMENT

| | 1971 | 1982 | 1971 | 1982 |
|---|---|---|---|---|
| | $ Billion | | Percent of GPP | |
| Federal Expenditure** | 4,677 | 24,285 | 11.7 | 17.7 |
| Provincial Expenditure* | 3,563 | 14,216 | 8.9 | 10.4 |
| Local Expenditure* | 3,701 | 11,178 | 9.3 | 8.1 |
| Total | 11,941 | 49,679 | 30.0 | 36.2 |
| Gross Provincial Product | 39,829 | 137,183 | | |

* Includes current and capital outlays, but excludes transfers to other levels of government (** and estimated defence expenditures).

SOURCE: Statistics Canada, Provincial Economic Accounts, Cat. No. 13-213.

## TABLE D2

### FEDERAL GOVERNMENT EXPENDITURE BY ENVELOPE*

### EXPENDITURE MANAGEMENT SYSTEM BASIS

| | 1976-77 | 1982-83 | 1976-77 | 1982-83 |
|---|---|---|---|---|
| | $ Million | | Percent Distribution | |
| Energy | 1,631 | 3,008 | 4.0 | 3.8 |
| Economic development | 4,739 | 8,546 | 11.7 | 10.7 |
| Social affairs | 18,605 | 31,993 | 46.1 | 40.1 |
| Justice and legal | 773 | 1,536 | 1.9 | 1.9 |
| Fiscal arrangements | 3,184 | 5,663 | 7.9 | 7.1 |
| External affairs and aid | 1,123 | 2,043 | 2.8 | 2.6 |
| Defence | 3,382 | 6,990 | 8.4 | 8.8 |
| Parliament | 73 | 167 | 0.2 | 0.2 |
| Services to government | 2,150 | 2,880 | 5.3 | 3.6 |
| Sub-total | 35,660 | 62,826 | 88.3 | 78.7 |
| Public debt | 4,721 | 16,971 | 11.7 | 21.3 |
| Total outlays | 40,381 | 79,797 | 100.0 | 100.0 |

* The Envelope system of categorizing expenditures was introduced in 1979 and the historical series begins in 1976-77. It is based on public accounts' concepts.

NOTE: Figures for all years an on a consistent basis; the Post Office is treated as a Crown Corporation. Distribution details may not add to totals due to rounding.

SOURCE: Department of Finance.

TABLE D3

PROFILE OF FEDERAL DEBT POSITION

($ MILLION CURRENT)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Debt Charges* | 1,974 | 2,253 | 2,518 | 2,961 | 3,705 | 4,519 | 5,101 | 6,410 | 8,080 | 9,897 | 13,739 | 16,675 | 17,420 | | |
| Total Revenue* | 17,241 | 19,560 | 22,809 | 29,978 | 31,703 | 35,313 | 36,503 | 38,390 | 43,586 | 51,165 | 65,198 | 65,583 | 70,238 | | |
| Debt Charges as a percent of Total Revenue | 11.4 | 11.5 | 11.0 | 9.9 | 11.7 | 12.8 | 14.0 | 16.7 | 18.5 | 19.3 | 21.1 | 25.4 | 24.8 | | |
| Net Public Debt Outstanding** as of March 31 | 18,895 | | | | | | | | | | | | | | |
| Net Public Debt** as a percent of GNP in the calendar year of the year end | | 21.0 | 19.9 | 18.2 | 16.6 | 18.3 | 19.1 | 22.5 | 25.8 | 26.9 | 28.3 | 29.3 | 34.7 | 40.0 | 45.2 |

* Based on national accounts data.

** Based on public accounts data. Figures were revised to reflect new concepts in November, 1983.

SOURCE: Department of Finance, Economic Review, 1984. Debt figures provided by David Lynn, 996-0331.

TABLE D4

DETERMINANTS OF GROWTH OF FEDERAL EXPENDITURE

| | 1971-1981 | 1981-1984 | 1984-1995 |
|---|---|---|---|
| **FINANCIAL ENVIRONMENT** | | | |
| Revenue Growth | ++ | - | 0 |
| Receptiveness to Tax Increases | + | - | - |
| Indebtedness | 0 | 0 | - |
| **DEMAND FOR SERVICE** | | | |
| Program Enrichments | ++ | + | - |
| Economic Support/Subsidies | ++ | ++ | ? |
| Unemployment/Welfare | + | + | + |
| **CONTRACTUAL OBLIGATIONS** | | | |
| Transfers to Provinces | + | + | ? |
| Interest on the Public Debt | 0 | ++ | ++ |

\+ Favourable to growth

0 Neutral

\- Unfavourable to growth

SOURCE: Economics Practice, Currie, Coopers & Lybrand.

TABLE D5

INDUSTRY INDICATORS: FEDERAL ADMINISTRATION IN ONTARIO

($ MILLION CURRENT)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | | |
| Total Expenditures in Ontario* | 4,677 | 5,510 | 6,327 | 7,744 | 9,433 | 10,305 | 11,507 | 12,740 | 13,993 | 16,312 | 19,842 | 24,285 | | |
| **CAPITAL INVESTMENT** | | | | | | | | | | | | | | |
| Construction | 119.2 | 119.8 | 131.4 | 155.2 | 154.8 | 146.4 | 134.2 | 130.0 | 85.7 | 109.5 | 127.2 | 109.0 | 143.2 | 176.3 |
| Machinery and Equipment | 70.3 | 80.2 | 113.5 | 174.5 | 154.7 | 159.2 | 151.9 | 154.7 | 138.3 | 154.7 | 300.3 | 270.2 | 335.8 | 455.9 |
| Total | 189.5 | 200.0 | 244.9 | 329.7 | 309.5 | 305.6 | 286.1 | 284.7 | 224.0 | 264.2 | 427.5 | 379.2 | 479.0 | 632.2 |
| **EMPLOYMENT** | | | | | | | | | | | | | | |
| Number of Employees** | 70,256 | 77,066 | 81,743 | 87,524 | 93,096 | 93,167 | 90,359 | 82,678 | 75,626 | 72,881 | 76,089 | 79,369 | 78,813 | 78,590 |

* Federal current expenditures excluding transfers to the province and to local governments and estimated defence expenditures plus gross capital formation.

** Public Service Commission data on employment with adjustments made to exclude national defence, civilian employees and post office employees. It was assumed that Ontario defence civilian employees accounted for 36 percent of the total for each year and that Ontario post office employees accounted for 40.4 percent of the total from 1971 to 1979.

SOURCE: Statistics Canada, Provincial Economic Accounts, Table 3; and Public and Private Investment in Canada, Cat. No. 61-206.

TABLE D6

INDUSTRY INDICATORS: FEDERAL ADMINISTRATION IN ONTARIO
(CURRENT DOLLAR PERCENT CHANGE)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | |
| Total Expenditures | 17.8 | 14.8 | 22.4 | 21.8 | 9.2 | 11.7 | 10.7 | 9.8 | 16.6 | 21.6 | 22.4 | | |
| **CAPITAL INVESTMENT** | | | | | | | | | | | | | |
| Construction | 0.5 | 9.7 | 18.1 | (0.3) | (5.4) | (8.3) | (3.1) | (34.1) | 27.8 | 16.2 | (14.3) | 31.4 | 23.1 |
| Machinery & Equipment | 14.1 | 41.5 | 53.7 | (11.3) | 2.9 | (4.6) | 1.8 | (10.6) | 11.9 | 94.1 | (10.0) | 24.3 | 35.8 |
| Total | 5.5 | 22.5 | 34.6 | (6.1) | (1.3) | (6.4) | (0.5) | (21.3) | 17.9 | 61.8 | (11.3) | 26.3 | 32.0 |
| **EMPLOYMENT** | | | | | | | | | | | | | |
| Number of Employees | 9.7 | 6.1 | 7.1 | 6.4 | 0.1 | (3.0) | (8.5) | (8.5) | (3.6) | 4.4 | 4.3 | (0.7) | (0.3) |

( ) indicates decline

SOURCE: Calculated from Table D5.

TABLE D7

INDUSTRY INDICATORS: FEDERAL ADMINISTRATION IN ONTARIO

( CONSTANT $ 1971 MILLION)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGGREGATE OUTPUT | | | | | | | | | | | | | | |
| Total Expenditures | 4,677 | 5,144 | 5,439 | 5,727 | 6,050 | 5,826 | 5,936 | 6,066 | 6,103 | 6,291 | 6,723 | 7,397 | | |
| CAPITAL INVESTMENT | | | | | | | | | | | | | | |
| Construction | 119.2 | 113.6 | 113.6 | 109.8 | 98.5 | 88.3 | 75.9 | 68.2 | 41.2 | 47.1 | 48.1 | 38.7 | 49.7 | 59.8 |
| Machinery and Equipment | 70.3 | 77.8 | 104.3 | 144.0 | 115.7 | 112.7 | 102.1 | 97.4 | 79.2 | 80.5 | 141.1 | 118.4 | 142.7 | 186.5 |
| Total | 189.5 | 191.4 | 217.9 | 253.8 | 214.2 | 201.0 | 178.0 | 165.6 | 120.4 | 127.6 | 189.2 | 157.1 | 192.4 | 246.3 |

NOTE: Output deflated by the Implicit Price Indexes for Government Current and Capital Expenditures and Capital Investment deflated by the Implicit Price Indexes for Government Non-Residential Construction and Machinery and Equipment.

SOURCE: As outlined on Table D5. Also, Statistics Canada, National Income and Expenditure Accounts, Cat. No. 13-201. Calculations and forecast deflators by Economics Practice, Currie, Coopers & Lybrand.

TABLE D8

INDUSTRY INDICATORS: FEDERAL ADMINISTRATION IN ONTARIO

(CONSTANT DOLLAR PERCENT CHANGE)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | |
| Total Expenditures | 10.0 | 5.7 | 5.3 | 5.6 | (3.7) | 1.9 | 2.2 | 0.6 | 3.1 | 6.9 | 10.0 | | |
| **INVESTMENT** | | | | | | | | | | | | | |
| Construction | (4.7) | 0.0 | (3.3) | (10.3) | (10.4) | (14.0) | (10.1) | (39.6) | 14.3 | 2.1 | (19.5) | 28.4 | 20.3 |
| Machinery and Equipment | 10.7 | 34.1 | 38.1 | (19.7) | (2.6) | (9.4) | (4.6) | (18.7) | 1.6 | 75.3 | (16.1) | 20.5 | 30.7 |
| Total | 1.0 | 13.8 | 16.5 | (15.6) | (6.2) | (11.4) | (7.0) | (27.3) | 6.0 | 48.3 | (17.0) | 22.5 | 28.0 |

( ) indicates decline

SOURCE: Calculated from Table D7.

# TABLE D9

## OCCUPATIONAL INDICATORS: FEDERAL ADMINISTRATION

## RANKING BY RELATIVE STRENGTH

| | NUMBER OF EMPLOYEES 1981 | AVERAGE ANNUAL RATE OF CHANGE PERCENT, 1971-1981 |
|---|---|---|
| I. TOTAL INDUSTRY | 105,415 | 2.4 |
| II. TWO DIGIT LEVEL | | |
| SALES | 150 | (6.9) |
| CLERICAL AND RELATED | 44,780 | 1.7 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 12,235 | 2.8 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 27,645 | 4.4 |
| II. FOUR DIGIT LEVEL | | |
| CLERICAL AND RELATED | | |
| Supervisors, Other Clerical and Related, n.e.c. | 1,925 | (3.0) |
| Other Clerical and Related, n.e.c. | 10,600 | (0.3) |
| Typists and Clerk-Typists | 2,665 | (0.1) |
| Secretaries and Stenographers | 5,980 | 0.1 |
| General Office Clerks | 4,200 | 1.7 |
| Library and File Clerks | 1,860 | 3.0 |
| Bookkeepers and Accounting Clerks | 5,150 | 4.6 |
| Electronic Data-Processing Equipment Operators | 2,835 | 6.9 |
| Statistical Clerks | 1,595 | 8.8 |
| Receptionists and Information Clerks | 1,475 | 10.1 |
| TOTAL | 44,780 | 1.7 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | |
| Systems Analysts, Computer Programmers and Related | 2,500 | 6.4 |
| Industrial Engineers | 1,005 | 10.2 |
| TOTAL | 12,235 | 2.8 |

TABLE D9 (cont'd)

OCCUPATIONAL INDICATORS: FEDERAL ADMINISTRATION

RANKING BY RELATIVE STRENGTH

| | NUMBER OF EMPLOYEES 1981 | AVERAGE ANNUAL RATE OF CHANGE PERCENT, 1971-1981 |
|---|---|---|
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | |
| Occupations Related to Management and Administration, n.e.c. | 3,285 | 0.5 |
| Government Administrators | 4,705 | 2.3 |
| Inspectors and Regulatory Officers, Government | 5,230 | 3.6 |
| Personnel and Related Officers | 3,330 | 3.9 |
| Accountants, Auditors and Other Financial Officers | 4,350 | 5.3 |
| Other Managers and Administrators, n.e.c. | 1,160 | 6.6 |
| Officials and Administrators Unique to Government, n.e.c. | 1,040 | 16.5 |
| TOTAL | 27,645 | 4.4 |

() Indicates decline.

NOTE: Details do not add to totals as all occupations are not included.

SOURCE: Census data, Ontario Ministry of Labour.

TABLE D10

OCCUPATIONAL INDICATORS: FEDERAL ADMINISTRATION

RANKING BY INCREASE IN FEMALE REPRESENTATION

| | FEMALES EMPLOYED 1981 | FEMALE EMPLOYMENT AS A PERCENT OF TOTAL 1971 | 1981 | NUMBER OF JOBS GAINED BY FEMALES 1971-1981 |
|---|---|---|---|---|
| I. TOTAL INDUSTRY | 50,390 | 40.6 | 47.8 | 16,595 |
| II. TWO DIGIT LEVEL | | | | |
| SALES | 55 | 27.9 | 36.7 | (30) |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 2,105 | 10.5 | 17.2 | 1,135 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 7,685 | 13.7 | 27.8 | 5,250 |
| CLERICAL AND RELATED | 35,240 | 71.4 | 78.7 | 8,205 |
| III. FOUR DIGIT LEVEL | | | | |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | | | | |
| Industrial Engineers | 320 | 2.6 | 31.8 | 310 |
| Systems Analysts, Computer Programmers and Related | 630 | 14.1 | 25.2 | 440 |
| TOTAL | 2,105 | 10.5 | 17.2 | 1,135 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | | |
| Other Managers and Administrators, n.e.c. | 365 | 51.2 | 31.5 | 50 |
| Official and Administrators Unique to Government, n.e.c. | 400 | 8.9 | 38.5 | 380 |
| Accountants, Auditors and Other Financial Officers | 795 | 9.0 | 18.3 | 560 |
| Government Administrators | 930 | 9.2 | 19.8 | 585 |
| Inspectors and Regulatory Officers, Government | 1,190 | 8.2 | 22.8 | 890 |
| Occupations Related to Management and Administration, n.e.c. | 1,405 | 16.4 | 42.8 | 890 |
| Personnel and Related Officers | 1,750 | 25.5 | 52.6 | 1,170 |
| TOTAL | 7,685 | 13.7 | 27.8 | 5,250 |

TABLE D10 (cont'd)

## OCCUPATIONAL INDICATORS: FEDERAL ADMINISTRATION

## RANKING BY INCREASE IN FEMALE REPRESENTATION

| | FEMALES EMPLOYED 1981 | FEMALE EMPLOYMENT AS A PERCENT OF TOTAL 1971 | 1981 | NUMBER OF JOBS GAINED BY FEMALES 1971-1981 |
|---|---|---|---|---|
| CLERICAL AND RELATED | | | | |
| Supervisors, Other Clerical and Related, n.e.c. | 1,270 | 51.5 | 66.0 | (75) |
| Secretaries and Stenographers | 5,900 | 98.4 | 98.7 | 100 |
| Typists and Clerk-Typists | 2,500 | 88.3 | 93.8 | 115 |
| Library and File Clerks | 1,300 | 69.4 | 69.9 | 335 |
| Other Clerical and Related, n.e.c. | 8,840 | 75.0 | 83.4 | 635 |
| Receptionists and Information Clerks | 1,325 | 82.3 | 89.8 | 860 |
| Statistical Clerks | 1,300 | 58.4 | 81.5 | 900 |
| General Office Clerks | 3,225 | 64.6 | 76.8 | 925 |
| Electronic Data-Processing Equipment Operators | 2,285 | 79.7 | 80.6 | 1,130 |
| Bookkeepers and Accounting Clerks | 3,550 | 58.9 | 68.9 | 1,610 |
| TOTAL | 35,240 | 71.4 | 78.7 | 8,205 |

() Indicates decline.

NOTE: Females employed in 1981 is calculated from percent of total. Details do not add to totals as all occupations are not included.

SOURCE: Census data, Ontario Ministry of Labour.

## TABLE D11

## SOURCES OF PROVINCIAL REVENUE IN ONTARIO

| | 1973-74 | 1980-81 | 1983-84 | 1973-74 | 1980-81 | 1983-84 |
|---|---|---|---|---|---|---|
| | | $ Million | | | Percent Distribution | |
| TAXATION | | | | | | |
| Personal Income Tax | 1,236 | 3,572 | 5,994 | 18.1 | 23.0 | 28.1 |
| Retail Sales Tax | 1,315 | 2,562 | 3,876 | 19.2 | 16.5 | 18.2 |
| Corporations Tax | 638 | 1,792 | 1,583 | 9.3 | 11.5 | 7.4 |
| Gasoline Tax | 477 | 618 | 932 | 7.0 | 4.0 | 4.4 |
| Tobacco Tax | 100 | 284 | 542 | 1.5 | 1.8 | 2.5 |
| Other | 301 | 621 | 436 | 4.4 | 4.0 | 2.0 |
| Sub-total | 4,067 | 9,449 | 13,363 | 59.4 | 60.8 | 62.7 |
| OTHER REVENUE | | | | | | |
| OHIP Premiums | 530 | 1,061 | 1,479 | 7.7 | 6.8 | 6.9 |
| Liquor Control Board | 280 | 433 | 520 | 4.1 | 2.8 | 2.4 |
| Vehicle Registration | 172 | 312 | 287 | 2.5 | 2.0 | 1.3 |
| Other | 237 | 781 | 1,049 | 3.5 | 5.0 | 4.9 |
| Sub-total | 1,219 | 2,587 | 3,335 | 17.8 | 16.6 | 15.6 |
| Transfers from Federal Government | 1,267 | 2,973 | 4,161 | 18.5 | 19.1 | 19.5 |
| Interest on Loans, Advances and Investments | 291 | 540 | 454 | 4.3 | 3.5 | 2.1 |
| TOTAL | 6,844 | 15,549* | 21,313 | 100.0 | 100.0 | 100.0 |

* Excludes payments into trust accounts and repayments of loans and advances.

SOURCE: Ontario Budget, 1976 and Province of Ontario, Financial Report, 1984.
Distribution calculations by Economics Practice, Currie, Coopers & Lybrand.

## TABLE D12

## COMPOSITION OF PROVINCIAL EXPENDITURE

| | 1973-74 | 1983-84 | 1973-74 | 1983-84 |
|---|---|---|---|---|
| | $ Million | | Percent Distribution | |
| Social Development Policy | | | | |
| Health | 2,049 | 7,582 | 28.4 | 30.9 |
| Education | 1,410 | 3,434 | 19.5 | 14.0 |
| Community and Social Services | 542 | 2,402 | 7.5 | 9.8 |
| Colleges and Universities | 785 | 2,035 | 10.9 | 8.3 |
| Citizenship and Culture | 63 | 205 | 0.9 | 0.8 |
| Social Secretariat | - | 13 | - | 0.1 |
| Sub-total | 4,849 | 15,671 | 67.1 | 63.8 |
| Resources Development Policy | | | | |
| Transportation and Communications | 684 | 1,541 | 9.5 | 6.3 |
| Municipal Affairs and Housing | 37 | 1,024 | 0.5 | 4.2 |
| Natural Resources | 153 | 408 | 2.1 | 1.7 |
| Environment | 45 | 254 | 0.6 | 1.0 |
| Agriculture and Food | 105 | 264 | 1.5 | 1.1 |
| Energy | 2 | 91 | 0.0 | 0.4 |
| Industry and Trade | 26 | 76 | 0.4 | 0.3 |
| Tourism and Recreation | | 110 | | 0.4 |
| Labour | 12 | 73 | 0.2 | 0.3 |
| Resources Secretariat | - | 3 | - | 0.0 |
| Sub-total | 1,064 | 3,844 | 14.7 | 15.7 |
| Justice Policy | | | | |
| Solicitor General | 90 | 291 | 1.2 | 1.2 |
| Attorney General | 68 | 261 | 0.9 | 1.1 |
| Correctional Services | 86 | 226 | 1.2 | 0.9 |
| Consumer and Commercial Relations | 29 | 131 | 0.4 | 0.5 |
| Justice Secretariat | - | 1 | - | 0.0 |
| Sub-total | 273 | 910 | 3.8 | 3.7 |
| General Government | | | | |
| Revenue | 54 | 620 | 0.7 | 2.5 |
| Government Services | 180 | 367 | 2.5 | 1.5 |
| Northern Affairs | - | 157 | - | 0.6 |
| Treasury and Economics EDF/BILD | 261 | 381 | 3.6 | 1.6 |
| Board of Internal Economy Management Board | 6 | 14 | 0.1 | 0.1 |
| Intergovernmental Affairs | - | 7 | - | 0.0 |
| Legislative and Executive Offices | 7 | 35 | 0.1 | 0.1 |
| Other | 4 | 13 | 0.1 | 0.1 |
| Sub-total | 512 | 1,594 | 7.1 | 6.5 |
| Public Debt Interest | 525 | 2,534 | 7.3 | 10.3 |
| TOTAL EXPENDITURE | 7,223 | 24,553 | 100.0 | 100.0 |

SOURCE: Ontario Budget, 1976 and Province of Ontario, Financial Report, 1984. Distribution calculations by Economics Practice, Currie, Coopers & Lybrand.

## TABLE D13

## PROFILE OF ONTARIO PUBLIC DEBT

| | 1973-74 | 1974-75 | 1980-81 | 1981-82 | 1983-84 | 1984-85 |
|---|---|---|---|---|---|---|
| Net Public Sector Debt | | | | | | |
| Outstanding $ billion | 15,463 | 17,272 | 33,596 | 37,108(e) | 41,211 | 45,279(f) |
| Net Debt as a Percent of | | | | | | |
| Gross Provincial Product | 30.7 | 29.2 | 30.0 | 29.0 | 30.9 | 31.3 |
| Debt Charges on Direct Debt* | 525 | 589 | 1,595 | 1,838 | 2,110 | 2,534(f) |
| Debt Charges as a Percent of Total Revenue | 7.7 | 7.2 | 9.7 | 9.7 | 10.3 | 11.2 |

e - estimate

f - forecast

* - Direct debt of the province. This accounted for 49 percent of public sector debt outstanding in 1983-84.

SOURCE: Province of Ontario, Financial Report, 1984 and 1982 Ontario Budget.

## TABLE D14

### GOVERNMENT REVENUES AND DEFICIT OR SURPLUS IN ONTARIO

| | 1971 $ | 1982 $ |
|---|---|---|
| Revenue per Capita* | | |
| Federal | 1,034 | 2,979 |
| Provincial | 581 | 1,927 |
| Local | 233 | 672 |
| Combined governments | 1,848 | 5,578 |
| Deficit or Surplus per Capita** | | |
| Federal | 204 | -412 |
| Provincial | -41 | -291 |
| Local | -13 | 93 |
| Combined governments | +150 | -610 |

* Excludes intergovernmental transfers.

** Excludes hospital sector and Canada Pension Plan.

SOURCE: Statistics Canada, Provincial Economic Accounts, Cat. No. 13-213.

TABLE D15

DETERMINANTS OF DEMAND FOR PROVINCIAL SERVICES

| | 1971-1981 | 1981-1984 | 1984-1995 |
|---|---|---|---|
| DEMAND FOR SERVICES | | | |
| Population Growth | ++ | + | + |
| Age Structure | + | 0 | + |
| Unemployment | 0 | + | + |
| FINANCIAL ENVIRONMENT | | | |
| Revenue Growth | + | - | - |
| Receptiveness to Tax Increases | + | - | - |
| Indebtedness | - | - | - |

\+ Favourable to expenditure growth

0 Neutral

\- Unfavourable

SOURCE: Economics Practice, Currie, Coopers & Lybrand.

TABLE D16

INDUSTRY INDICATORS: PROVINCIAL ADMINISTRATION IN ONTARIO
(CURRENT $ MILLION)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | | |
| Gross Domestic Product | 529.1 | 599.7 | 675.1 | 832.4 | 1,010.9 | 1,090.3 | 1,223.1 | 1,396.6 | 1,529.6 | 1,730.9 | 1,940.9 | 2,174.8 | | |
| **CAPITAL INVESTMENT** | | | | | | | | | | | | | | |
| Construction | 285.9 | 372.8 | 403.6 | 494.4 | 506.8 | 489.6 | 493.7 | 574.2 | 645.3 | 669.2 | 700.1 | 813.4 | 744.6 | 801.3 |
| Machinery and Equipment | 12.9 | 14.0 | 19.7 | 19.7 | 24.4 | 25.6 | 54.2 | 32.5 | 32.3 | 28.0 | 60.5 | 68.1 | 62.8 | 59.1 |
| Total | 298.8 | 386.8 | 423.3 | 514.1 | 531.2 | 515.2 | 547.9 | 606.7 | 677.6 | 697.2 | 760.6 | 881.5 | 807.4 | 860.4 |
| **EMPLOYMENT** | | | | | | | | | | | | | | |
| Number of Employees* | 65,018 | 67,501 | 68,634 | 69,789 | 68,225 | 68,481 | 69,296 | 69,634 | 69,448 | 69,488 | 68,554 | 69,112 | 67,629 | |

* Direct government employees classified under the Public Service Act (excludes Workmen's Compensation employees) as provided by the Ontario Civil Service Commission. Data for 1971 is for year ending December, and for 1972 to 1983 is based on fiscal year ending in March of the next year (i.e., the 1983 number is actually March, 1984).

SOURCE: Statistics Canada, Provincis' Gross Domestic Product by Industry, Cat. No. 61-202; and Public and Private Investment in Canada, Cat. No. 61-205.

TABLE D17

INDUSTRY INDICATORS: PROVINCIAL ADMINISTRATION IN ONTARIO

(CURRENT DOLLAR PERCENT CHANGE)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGGREGATE OUTPUT | | | | | | | | | | | | | |
| Gross Domestic Product | 13.3 | 12.6 | 23.3 | 21.4 | 7.9 | 12.2 | 14.2 | 9.5 | 13.2 | 12.1 | 12.1 | | |
| CAPITAL INVESTMENT | | | | | | | | | | | | | |
| Construction | 30.4 | 8.3 | 22.5 | 2.5 | (3.4) | 0.8 | 16.3 | 12.4 | 3.7 | 4.6 | 16.2 | (8.5) | (7.6) |
| Machinery and Equipment | 8.5 | 40.7 | 0.0 | 23.9 | 4.9 | 111.7 | (40.0) | (0.6) | (13.3) | 116.1 | 12.6 | (7.8) | (5.9) |
| Total | 29.5 | 9.4 | 21.5 | 3.0 | (3.0) | 6.3 | 10.7 | 11.7 | 2.9 | 9.1 | 15.9 | (8.4) | 6.6 |
| EMPLOYMENT | | | | | | | | | | | | | |
| Number of Employees | 3.8 | 1.7 | 1.7 | (2.2) | 0.4 | 1.2 | 0.5 | (0.3) | 0.1 | (1.3) | 0.8 | 2.1 | |

( ) indicates decline.

SOURCE: Calculated from Table D16.

TABLE D18

INDUSTRY INDICATORS: PROVINCIAL ADMINISTRATION IN ONTARIO

(CONSTANT $ 1971 MILLION)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGGREGATE OUTPUT | | | | | | | | | | | | | | |
| Gross Domestic Product | 529.1 | 555.9 | 581.9 | 623.0 | 668.5 | 676.5 | 699.0 | 707.7 | 717.9 | 727.7 | 727.5 | 747.9 | | |
| CAPITAL INVESTMENT | | | | | | | | | | | | | | |
| Construction | 285.9 | 353.4 | 348.8 | 349.9 | 322.6 | 295.3 | 279.2 | 301.1 | 310.2 | 288.1 | 264.7 | 288.8 | 258.3 | 272.0 |
| Machinery and Equipment | 12.9 | 13.6 | 18.1 | 16.3 | 18.2 | 18.1 | 36.4 | 20.5 | 18.5 | 14.6 | 28.4 | 29.8 | 26.7 | 24.2 |
| Total | 298.8 | 367.0 | 366.9 | 366.2 | 340.8 | 313.4 | 315.6 | 321.6 | 328.7 | 302.7 | 293.1 | 318.6 | 285.0 | 296.2 |

NOTE: Capital Investment deflated by the Implicit Price Indexes for Government Non-Residential Construction and Machinery and Equipment.

SOURCE: As outlined on Table D16. Also, Statistics Canada, National Income and Expenditure Accounts, Cat. No. 13-201. Calculations and forecast deflators by Economics Practice, Currie, Coopers & Lybrand.

TABLE D19

INDUSTRY INDICATORS: PROVINCIAL ADMINISTRATION IN ONTARIO

(CONSTANT DOLLAR PERCENT CHANGE)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGGREGATE OUTPUT | | | | | | | | | | | | | |
| Gross Domestic Product | 5.1 | 4.7 | 7.1 | 7.3 | 1.2 | 3.3 | 1.2 | 1.4 | 1.4 | (0.0) | 2.8 | | |
| CAPITAL INVESTMENT | | | | | | | | | | | | | |
| Construction | 23.6 | (1.3) | 0.3 | (7.8) | (8.5) | (5.5) | 7.8 | 3.0 | (7.1) | (8.1) | 9.1 | (10.6) | 5.3 |
| Machinery and Equipment | 5.4 | 33.1 | (9.9) | 11.7 | (0.5) | 101.1 | (43.7) | (9.8) | (21.1) | 94.5 | 4.9 | (10.4) | (9.4) |
| Total | 22.8 | (0.0) | (0.2) | (6.9) | (8.0) | 0.7 | 1.9 | 2.2 | (7.9) | (3.2) | 8.7 | (10.5) | 3.9 |

( ) indicates decline.

SOURCE: Calculated from Table D18.

## TABLE D20

### OCCUPATIONAL INDICATORS: PROVINCIAL ADMINISTRATION

### RANKING BY RELATIVE STRENGTH

| | | NUMBER OF EMPLOYEES 1981 | AVERAGE ANNUAL RATE OF CHANGE PERCENT, 1971-1981 |
|---|---|---|---|
| I. | TOTAL INDUSTRY | 65,840 | 1.9 |
| II. | TWO DIGIT LEVEL | | |
| | SALES | 295 | (6.2) |
| | NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 5,755 | 0.8 |
| | CLERICAL AND RELATED | 21,940 | 2.6 |
| | MANAGERIAL, ADMINISTRATIVE AND RELATED | 12,215 | 6.2 |
| II. | FOUR DIGIT LEVEL | | |
| | CLERICAL AND RELATED | | |
| | Typists and Clerk-Typists | 2,085 | (1.1) |
| | General Office Clerks | 2,245 | 0.6 |
| | Secretaries and Stenographers | 4,730 | 3.3 |
| | Other Clerical and Related, n.e.c. | 2,705 | 4.2 |
| | Bookkeepers and Accounting Clerks | 3,045 | 5.8 |
| | Electronic Data-Processing Equipment Operators | 1,305 | 8.2 |
| | TOTAL | 21,940 | 2.6 |
| | MANAGERIAL, ADMINISTRATIVE AND RELATED | | |
| | Inspectors, and Regulatory Officers, Government | 2,780 | 3.0 |
| | Accountants, Auditors and Other Financial Officers | 1,630 | 3.2 |
| | Government Administrators | 1,705 | 5.4 |
| | Occupations Related to Management and Administration, n.e.c. | 1,365 | 7.3 |
| | Officials and Administrators Unique to Government, n.e.c. | 1,035 | 16.0 |
| | TOTAL | 12,215 | 6.2 |

() Indicates decline.

NOTE: Details do not add to totals as all occupations are not included.

SOURCE: Census data, Ontario Ministry of Labour.

TABLE D21

## OCCUPATIONAL INDICATORS: PROVINCIAL ADMINISTRATION
## RANKING BY INCREASE IN FEMALE REPRESENTATION

| | FEMALES EMPLOYED 1981 | FEMALE EMPLOYMENT AS A PERCENT OF TOTAL 1971 | 1981 | NUMBER OF JOBS GAINED BY FEMALES 1971-1981 |
|---|---|---|---|---|
| I. TOTAL INDUSTRY | 27,980 | 33.6 | 42.5 | 9,695 |
| II. TWO DIGIT LEVEL | | | | |
| SALES | 145 | 16.1 | 49.2 | 55 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 1,075 | 8.5 | 18.7 | 625 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 2,810 | 10.9 | 23.0 | 2,085 |
| CLERICAL AND RELATED | 17,265 | 72.0 | 78.7 | 5,090 |
| III. FOUR DIGIT LEVEL | | | | |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | | |
| Accountants, Auditors and Other Financial Officers | 240 | 6.3 | 14.7 | 165 |
| Government Administrators | 340 | 13.9 | 19.9 | 200 |
| Inspectors and Regulatory Officers, Government | 285 | 3.6 | 10.3 | 210 |
| Officials and Administrators Unique to Government, n.e.c. | 355 | 4.3 | 34.3 | 345 |
| Occupations Related to Management and Administration, n.e.c. | 615 | 17.8 | 45.1 | 495 |
| TOTAL | 2,810 | 10.9 | 23.0 | 2,085 |
| CLERICAL AND RELATED | | | | |
| Typists and Clerk-Typists | 2,040 | 96.1 | 97.8 | (190) |
| General Office Clerks | 1,805 | 68.9 | 80.4 | 345 |
| Eletronic Data-Processing Equipment Operators | 1,040 | 88.2 | 79.7 | 515 |
| Other Clerical and Related, n.e.c. | 1,845 | 57.4 | 68.2 | 815 |
| Bookkeepers and Accounting Clerks | 1,995 | 51.1 | 65.5 | 1,105 |
| Secretaries and Stenographers | 4,605 | 96.3 | 97.4 | 1,320 |
| TOTAL | 17,265 | 72.0 | 78.7 | 5,090 |

() Indicates decline.

NOTE: Females employed in 1981 is calculated from percent of total.
Details do not add to totals as all occupations are not included.

SOURCE: Census data, Ontario Ministry of Labour.

## TABLE D22

## COMPOSITION OF MUNICIPAL REVENUE AND EXPENDITURE IN ONTARIO

| | 1976 | 1982 | 1976 | 1982 |
|---|---|---|---|---|
| | $ Million | | Percent Distribution | |
| **Municipal Revenue** | | | | |
| Taxation | 1,469 | 2,758 | 42.5 | 34.6 |
| Ontario Grants | 1,288 | 2,533 | 37.3 | 31.7 |
| Other | 697 | 2,269 | 20.2 | 28.4 |
| Long Term Borrowing | - | 419 | - | 5.3 |
| TOTAL | 3,454 | 7,979 | 100.0 | 100.0 |
| **Municipal Expenditure** | | | | |
| Salaries & Wages | 1,393 | 3,216 | 47.3 | 48.1 |
| Materials & Supplies | 723 | 1,771 | 24.5 | 26.5 |
| Transfers* | 251 | 564 | 8.5 | 8.4 |
| Financial Expenses | 57 | - | 1.9 | - |
| Sub-total | 2,424 | 5,551 | 82.3 | 83.0 |
| Debt Charges | 277 | 532 | 9.4 | 8.0 |
| Transfers to Reserves | 246 | 603 | 8.3 | 9.0 |
| Sub-total | 523 | 1,135 | 17.7 | 17.0 |
| TOTAL | 2,947 | 6,686 | 100.0 | 100.0 |

* Payments to individuals and to unconsolidated boards and commissions.

NOTE: Distribution details may not add to totals due to rounding.

SOURCE: Ministry of Municipal Affairs and Housing, Local Government Finance in Ontario, 1975-76 and 1982.

## TABLE D23

## COMPOSITION OF MUNICIPAL SERVICES IN ONTARIO

| | 1976 | 1982 | 1976 | 1982 |
|---|---|---|---|---|
| | $ Million | | Percent Distribution | |
| General Government | 311 | 741 | 10.6 | 11.1 |
| Protection | 603 | 1,197 | 20.5 | 17.9 |
| Transportation | 677 | 1,605 | 23.0 | 24.0 |
| Environment | 318 | 963 | 10.8 | 14.4 |
| Health and Social Services | 584 | 1,265 | 19.8 | 18.9 |
| Culture and Recreation | 370 | 739 | 12.6 | 11.1 |
| Planning and Development | 84 | 176 | 2.9 | 2.6 |
| TOTAL | 2,947 | 6,686 | 100.0 | 100.0 |

NOTE: Distribution details may not add to totals due to rounding.

SOURCE: Ministry of Municipal Affairs and Housing, Local Government Finance in Ontario, 1975-76 and 1982.

## TABLE D24

### MUNICIPAL PROPERTY TAXES* AS A PERCENT OF HOUSEHOLD INCOME IN ONTARIO

| | 1970 | 1974 | 1975 | 1981 | 1982 |
|---|---|---|---|---|---|
| Gross | 3.2 | 2.4 | 2.4 | 2.6 | 2.7 |
| Net** | 2.7 | 1.7 | 1.8 | 2.1 | 2.2 |
| Municipal Taxes as a percent of School Taxes | 100.6 | 124.0 | 125.1 | 106.8 | 104.4 |

* Includes school taxes.

** Excludes provincial tax credits and municipal programs that alleviate property tax burdens for some taxpayers.

SOURCE: Local Government Finance in Ontario, op. cit. various issues.

## TABLE D25

### DETERMINANTS OF DEMAND FOR MUNICIPAL SERVICES

| | 1971-1981 | 1981-1984 | 1984-1995 |
|---|---|---|---|
| Population Growth | ++ | + | + |
| Age Structure | ? | + | + |
| Urbanization | ++ | + | + |
| Unemployment | 0 | ++ | + |
| Revenue Growth | + | - | - |
| Receptiveness to Tax Increases | + | - | - |

\+ Favourable to growth
0 Neutral
\- Unfavourable to growth

SOURCE: Economics Practice, Currie, Coopers & Lybrand.

TABLE D26

INDUSTRY INDICATORS: LOCAL ADMINISTRATION IN ONTARIO

($ MILLION CURRENT)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | | |
| Gross Domestic Product | 547.1 | 626.9 | 695.0 | 830.9 | 997.4 | 1,216.8 | 1,383.8 | 1,507.4 | 1,692.6 | 1,965.0 | 2,286.5 | 2,672.7 | | |
| **CAPITAL INVESTMENT** | | | | | | | | | | | | | | |
| Construction | 388.2 | 419.6 | 435.5 | 613.5 | 725.3 | 709.8 | 722.7 | 730.4 | 805.3 | 838.6 | 909.7 | 1,055.7 | 1,111.9 | 1,200.9 |
| Machinery & Equipment | 20.8 | 24.0 | 32.7 | 44.2 | 64.4 | 60.5 | 68.7 | 64.7 | 63.5 | 66.2 | 72.0 | 85.9 | 95.3 | 100.4 |
| Total | 409.0 | 443.6 | 468.2 | 657.7 | 789.7 | 770.3 | 791.4 | 795.1 | 868.8 | 904.8 | 981.7 | 1,141.6 | 1,207.2 | 1,301.3 |
| **EMPLOYMENT** | | | | | | | | | | | | | | |
| Number of Employees | 88,733 | 93,326 | 99,176 | 101,603 | 106,528 | 110,488 | 115,621 | 118,520 | 118,345 | 121,630 | 123,827 | 129,960 | 135,023 | |

SOURCE: Statistics Canada, Provincial Gross Domestic Product by Industry, Cat. No. 61-202; Public and Private Investment in Canada, Cat. No. 61-205; and Local Government Employment, Cat. No. 72-009.

TABLE D27

INDUSTRY INDICATORS: LOCAL ADMINISTRATION IN ONTARIO
(CURRENT DOLLAR PERCENT CHANGE)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | |
| Gross Domestic Product | 14.6 | 10.9 | 19.6 | 20.0 | 22.0 | 13.7 | 8.9 | 12.3 | 16.1 | 16.4 | 16.9 | | |
| **CAPITAL INVESTMENT** | | | | | | | | | | | | | |
| Construction | 8.1 | 3.8 | 40.9 | 18.2 | (2.1) | 1.8 | 1.1 | 10.3 | 4.1 | 8.5 | 16.0 | 5.3 | 8.0 |
| Machinery & Equipment | 15.4 | 36.3 | 35.2 | 45.7 | (6.1) | 13.6 | (5.8) | (1.9) | 4.3 | 8.8 | 19.3 | 10.9 | 5.4 |
| Total | 8.5 | 5.5 | 40.5 | 20.1 | (2.5) | 2.7 | 0.5 | 9.3 | 4.1 | 8.5 | 16.3 | 5.7 | 7.8 |
| **EMPLOYMENT** | | | | | | | | | | | | | |
| Number of Employees | 5.2 | 6.3 | 2.4 | 4.8 | 3.7 | 4.6 | 2.5 | (0.1) | 2.8 | 1.8 | 5.0 | 3.9 | |

( ) indicates decline.

SOURCE: Calculated from Table D26.

TABLE D28

INDUSTRY INDICATORS: LOCAL ADMINISTRATION IN ONTARIO
(CONSTANT $ 1971 MILLION)

| | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **AGGREGATE OUTPUT** | | | | | | | | | | | | | | |
| Gross Domestic Product | 547.1 | 573.9 | 602.2 | 608.3 | 637.9 | 659.6 | 695.7 | 701.5 | 706.6 | 740.4 | 753.1 | 788.2 | | |
| **CAPITAL INVESTMENT** | | | | | | | | | | | | | | |
| Construction | 388.2 | 397.7 | 376.4 | 434.2 | 461.7 | 428.1 | 408.8 | 383.0 | 387.2 | 361.0 | 343.9 | 374.9 | 385.7 | 407.6 |
| Machinery & Equipment | 20.8 | 23.3 | 30.1 | 36.5 | 48.2 | 42.8 | 46.2 | 40.7 | 36.4 | 34.4 | 33.8 | 37.6 | 40.5 | 41.1 |
| Total | 409.0 | 421.0 | 406.5 | 470.7 | 509.9 | 470.9 | 455.0 | 423.7 | 423.6 | 395.4 | 377.7 | 412.5 | 426.2 | 448.7 |

NOTE: Capital Investment data is deflated by the Implicit Price Indexes for Business Non-Residential Construction and Machinery and Equipment.

SOURCE: As outlined in Table D26. Also, Statistics Canada, National Income and Expenditure Accounts, Cat. No. 13-201. Calculations and forecast deflators by Economics Practice, Currie, Coopers & Lybrand.

TABLE D29

INDUSTRY INDICATORS: LOCAL ADMINISTRATION IN ONTARIO
(CONSTANT DOLLAR PERCENT CHANGE)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGGREGATE OUTPUT | | | | | | | | | | | | | |
| Gross Domestic Product | 4.9 | 4.9 | 1.0 | 4.9 | 3.4 | 5.5 | 0.8 | 0.7 | 4.8 | 1.7 | 4.7 | | |
| CAPITAL INVESTMENT | | | | | | | | | | | | | |
| Construction | 2.4 | (5.4) | 15.4 | 6.3 | (7.3) | (4.5) | (6.3) | 1.1 | (6.8) | (4.7) | 9.0 | 2.9 | 5.7 |
| Machinery & Equipment | 12.0 | 29.2 | 21.3 | 32.1 | (11.2) | 7.9 | (11.9) | (10.6) | (5.5) | (1.7) | 11.2 | 7.7 | 1.5 |
| Total | 2.9 | (3.4) | 15.8 | 8.3 | (7.6) | (3.4) | (6.9) | (0.0) | (6.7) | (4.5) | 9.2 | 3.3 | 5.3 |

( ) indicates decline

SOURCE: Calculated from Table D28.

## TABLE D30

## OCCUPATIONAL INDICATORS: LOCAL ADMINISTRATION

### RANKING BY RELATIVE STRENGTH

| | | NUMBER OF EMPLOYEES 1981 | AVERAGE ANNUAL RATE OF CHANGE PERCENT, 1971-1981 |
|---|---|---|---|
| I. | TOTAL INDUSTRY | 80,400 | 3.3 |
| II. | TWO DIGIT LEVEL | | |
| | SALES | 255 | 2.7 |
| | CLERICAL AND RELATED | 13,605 | 3.3 |
| | NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 4,360 | 5.2 |
| | MANAGERIAL, ADMINISTRATIVE AND RELATED | 7,515 | 7.1 |
| II. | FOUR DIGIT LEVEL | | |
| | CLERICAL AND RELATED | | |
| | Other Clerical and Related, n.e.c. | 1,095 | (0.3) |
| | Typists and Clerk-Typists | 1,310 | 1.0 |
| | General Office Clerks | 1,385 | 1.5 |
| | Bookkeepers and Accounting Clerks | 2,465 | 2.8 |
| | Secretaries and Stenographers | 3,135 | 4.3 |
| | TOTAL | 13,605 | 3.3 |
| | MANAGERIAL, ADMINISTRATIVE AND RELATED | | |
| | Inspectors and Regulatory Officers, Government | 1,480 | 2.7 |
| | Government Administrators | 1,655 | 6.6 |
| | TOTAL | 7,515 | 7.1 |

() Indicates decline.

NOTE: Details do not add to totals as all occupations are not included.

SOURCE: Census data, Ontario Ministry of Labour.

TABLE D31

OCCUPATIONAL INDICATORS: LOCAL ADMINISTRATION

RANKING BY INCREASE IN FEMALE REPRESENTATION

| | FEMALES EMPLOYED 1981 | FEMALE EMPLOYMENT AS A PERCENT OF TOTAL 1971 | 1981 | NUMBER OF JOBS GAINED BY FEMALES 1971-1981 |
|---|---|---|---|---|
| I. TOTAL INDUSTRY | 22,510 | 19.0 | 28.0 | 11,430 |
| II. TWO DIGIT LEVEL | | | | |
| SALES | 180 | 35.9 | 70.6 | 110 |
| NATURAL SCIENCES, ENGINEERING AND MATHEMATICS | 525 | 5.3 | 12.0 | 385 |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | 1,805 | 13.5 | 24.0 | 1,295 |
| CLERICAL AND RELATED | 10,600 | 66.8 | 77.9 | 4,015 |
| III. FOUR DIGIT LEVEL | | | | |
| MANAGERIAL, ADMINISTRATIVE AND RELATED | | | | |
| Inspectors and Regulatory Officers, Government | 85 | 5.3 | 5.7 | 25 |
| Government Administrators | 465 | 18.4 | 28.1 | 305 |
| TOTAL | 1,805 | 13.5 | 24.0 | 1,295 |
| CLERICAL AND RELATED | | | | |
| Other Clerical and Related, n.e.c. | 665 | 44.7 | 60.7 | 160 |
| Typists and Clerk-Typists | 1,275 | 92.4 | 97.3 | 180 |
| General Office Clerks | 1,005 | 52.5 | 72.6 | 380 |
| Bookkeepers and Accounting Clerks | 1,780 | 54.7 | 72.2 | 760 |
| Secretaries and Stenographers | 3,080 | 96.4 | 98.2 | 1,095 |
| TOTAL | 10,600 | 66.8 | 77.9 | 4,015 |

NOTE: Females employed in 1981 is calculated from percent of total.
Details do not add to totals as all occupations are not included.

SOURCE: Census data, Ontario Ministry of Labour.

# FINAL REPORT AND APPENDICES OF THE ONTARIO TASK FORCE ON EMPLOYMENT AND NEW TECHNOLOGY

Final Report — Employment and New Technology

Appendices:

1. Labour Market Trends in Ontario, 1950-1980
2. Occupational Employment Trends in Ontario, 1971-1981
3. Emerging New Technology, 1985-95: Framework for a Survey of Firms
4. Employment and New Technology in Ontario's Manufacturing Sector: A Summary of Selected Industries
5. Employment and New Technology in the Iron and Steel Industry
6. Employment and New Technology in the Metal Fabricating Industry
7. Employment and New Technology in the Machinery and Equipment Industry
8. Employment and New Technology in the Aircraft and Aircraft Parts Industry
9. Employment and New Technology in the Communications Equipment Industry
10. Employment and New Technology in the Office, Store and Business Machine Industry
11. Employment and New Technology in the Plastic Processing Industry
12. Employment and New Technology in Ontario's Service Sector: A Summary of Selected Industries
13. Employment and New Technology in the Chartered Banks and Trust Industry
14. Employment and New Technology in the Insurance Industry
15. Employment and New Technology in the Government Services Industry
16. Employment and New Technology in the Telecommunications Industry
17. Employment and New Technology in the Retail Trade Industry
18. Employment and New Technology in the Computer Services and Management Consulting Industry
19. Industry-Sector and Occupational Employment in Ontario, 1985-1995
20. Technological Change, Productivity, and Employment: Studies of the Overall Economy